15

VOL. CXVII., No. 5. MAY, 1899. No. 325.

THE AMERICAN JOURNAL OF THE MEDICAL SCIENCES.

Published Monthly.

EDITED BY ALFRED STENGEL, M.D.

WITH THE CO-OPERATION IN LONDON OF

HECTOR MACKENZIE, M.A., M.D., F.R.C.P.

ORIGINAL ARTICLES

TUDY OF LEUCOCYTOSIS ASSOCIATED WITH CONVULSIONS 503
BY FRED GRANT BURROWS, A.M., M.D.
ASE OF BRAIN TUMOR AT THE BASE OF THE SECOND LEFT FRONTAL CONVO-
UTION 526
BY HERMON C. GORDINIER, A.M., M.D.
COMA OF THE TESTICLE 535
BY GEORGE MARTIN KOBER, M.D.
ACHMENT OF THE RETINA 553
BY MATTHIAS LANCKTON FOSTER, M.D.
ULD THE UNITED STATES PHARMACOPŒIA RECOGNIZE VERATRUM ALBUM AND
ERATRUM VIRIDE AS ONE DRUG? 562
BY HORATIO C. WOOD, M.D., AND HORATIO C. WOOD, JR., M.D.
ICAL SUMMARY OF THE QUESTION OF FATTY DEGENERATION 569
BY ALONZO ENGLEBERT TAYLOR, M.D.
E RECENT LITERATURE REGARDING CANCER 579
BY CHARLES H. FRAZIER, M.D.

REVIEWS 586

PROGRESS OF MEDICAL SCIENCE

CINE.—*WILLIAM OSLER, M.D., AND GEORGE DOCK, M.D.* 595
ERY.—*J. WILLIAM WHITE, M.D., ALFRED C. WOOD, M.D., AND CHARLES L. LEONARD, M.D.* 601
ATRICS.—*LOUIS STARR, M.D., AND THOMPSON S. WESTCOTT M.D.* 606
APEUTICS.—*REYNOLD W. WILCOX, M.D., LL.D.* 609
COLOGY.—*HENRY C. COE, M.D.* 615
ETRICS.—*EDWARD P. DAVIS, A.M., M.D.* 618
HALMOLOGY.—*EDWARD JACKSON, AM., M.D., AND T. B. SCHNEIDEMAN, A.M., M.D.* 622
OLOGY AND BACTERIOLOGY.—*W. T. COUNCILMAN, M.D., AND F. B. MALLORY, M.D.* 625

PHILADELPHIA AND NEW YORK:
LEA BROTHERS & CO.
LONDON: J. C. NIMMO, No. 14 KING WILLIAM ST., STRAND, W. C.

1899, by LEA BROTHERS & Co. All rights reserved. Entered at the Post-Office at Philadelphia as Second-class matter.

SUBSCRIPTION, FOUR DOLLARS A YEAR, POSTPAID.

L NEWS, Subscription Price Four Dollars per annum. If taken in conjunction with THE AMERICAN
L OF THE MEDICAL SCIENCES, a commutation rate of Seven Dollars and Fifty cents is made.

...FORTHCOMING...

Cheyne & Burghard's Surgical Treatment. Shortly

A Manual of Surgical Treatment. By W. Watson Cheyne, M.B F.R C.S., F.R.S., Professor of Surgery in King's College, London; and F. F Burghard, M.D., F.R.C.S., Teacher of Practical Surgery in King's Colleg London. In six octavo volumes, illustrated. *Vol. I. shortly.*

Hare on Typhoid Fever. Shortly.

The Medical Complications, Accidents and Sequelæ of Typhoid or Enteri Fever. By Hobart Amory Hare, M.D., B.Sc., Professor of Therapeutics i the Jefferson Medical College of Philadelphia; Physician to the Jefferso Hospital. With a Special Chapter on the Mental Disturbances followin Typhoid Fever, by F. X. Dercum, M.D., Clinical Professor of Disease of the Nervous System in the Jefferson Medical College. In one handsom octavo volume of about 300 pages with charts and full-page plates.

Crook on Mineral Waters. Shortly.

The Mineral Springs and Wells of the United States. By James K Crook, M.D., Adjunct Professor of Medicine in the New York Post-Graduat School of Medicine. In one octavo volume of about 550 pages.

Schleif's Materia Medica, Therapeutics, etc. Shortly

A Pocket Text-Book of Materia Medica, Therapeutics, Prescription Writing Medical Latin and Medical Pharmacy. By William Schleif, Ph.G., M.D Instructor in Practical Pharmacy in the University of Pennsylvania. In on 12mo. volume of about 400 pages. *Lea's Series of Pocket Text-Books*, edited b Bern B. Gallaudet, M.D.

Bruce's Principles of Treatment. In Press.

The Principles of Treatment. A Treatise on the Practice of Medicin By J. Mitchell Bruce, M.D., F.R.C.P., Lecturer on the Practice of Medicin in Charing Cross Hospital, London; Examiner in Medicine, Royal College c Physicians, London. Revised to conform with the United States Pharmacopœi by E. Q. Thornton, M.D., Jefferson Medical College, Philadelphia. In on octavo volume of about 700 pages.

Park's Bacteriology. Preparing.

Bacteriology in Medicine and Surgery. By William H. Park, M.D Adjunct Professor of Bacteriology and Hygiene in the University and Bellevu Hospital Medical College, New York. In one 12mo. volume of about 550 page with illustrations.

LEA BROTHERS & CO., PUBLISHERS, { *706, 708 & 710 Sansom St., Philadelphia*
{ *111 Fifth Avenue, New York.*

There remains, therefore, a pathological leucocytosis which is not explained by the muscular work done during the convulsion. It is to be regretted that we have practically no information concerning the condition of the blood immediately before a convulsion. In one of Capps's cases there seemed to be a fall of the leucocytes an hour before the convulsion; in one of our cases this did not occur one and a half hours before the convulsion. (See Table II.) The question is, therefore, still an open one. The case with very numerous convulsions does not help us in this respect, on account of the frequency of the convulsions. The occurrence of a fall in the leucocytosis would be in accord with the observations that there is at times a fall in the number of leucocytes in other diseases before the occurrence of a leucocytosis.

We see from this study that leucocytosis associated with convulsions is by no means confined to general paralysis, but occurs in other diseases as well, and has been found in a case of catatonia where the convulsions were more of a hysterical character, and in part, at least, not associated with loss of consciousness. It would certainly be interesting to study the blood in convulsions of still other diseases, especially hysteria and epilepsy.

While this study, therefore, does not furnish data of diagnostic value, the fact of the existence of a leucocytosis in a condition still so obscure in its pathogenesis as convulsions is of interest, since the studies of leucocytosis, especially those of Goldscheider and Jacob,[7] have made the explanation very probable that the origin of leucocytosis is to be sought in the presence of a chemotaxic substance circulating in the blood.

CONCLUSIONS. This study has shown that there is a leucocytosis associated with convulsions, not only in general paralysis, but in various other diseases as well, and that the leucocytosis bears a relation to the severity of the seizure. It has further shown that this leucocytosis is in part due to the muscular work done during a convulsion—a part, which owing to its "physiological" character and its short duration, has been shown to be superimposed upon a pathological leucocytosis of longer duration.

I wish to thank Dr. Cowles for the use of the clinical material and for the facilities for study afforded me during my service at the McLean Hospital. My thanks are equally due to Dr. Hoch for valuable instruction and advice in the prosecution of this study.

EXPLANATION OF THE TABLES. The tables are arranged in the order in which the cases are considered in the text. First, the abnormal, and following that the normal blood of each patient is given.

The percentages were calculated by counting 1000 leucocytes in each instance.

The following abbreviations are used in the tables:

Polyn.—Polymorphonuclear neutrophiles.
Lymph.—Lymphocytes, or small mononuclear elements.
L. M. N.—Large mononuclear elements.
Eosin.—Eosinophilic leucocytes.
Myelo.—Myelocytes (elements not found in normal blood).

BIBLIOGRAPHY.

1. Capps, J. A. A Study of the Blood in General Paralysis. AMERICAN JOURNAL OF THE MEDICAL SCIENCES, June, 1896.
2. Thayer, William S. Remarks on the Clinical Value of Ehrlich's Method of Examination of the Blood. Boston Medical and Surgical Journal, vol. cxxviii.
3. Rieder, Herman. Beiträge zur Kuntniss der Leukocytose, 1892.
4. Elzholz, Adolf. Beiträge zur Kuntniss des Delerium Tremens. Jahrbücher f. Psychiatrie u Neurologie, 1897, vol. xv. p. 180.
5. Cabot. Clinical Examination of the Blood.
6. Schultz. Deut. Arch. f. klin. Med., 1893, p. 234.
7. Goldscheider und Jacob. Review by v. Limbeck, Allgemeine Pathologie des Blutes in: Lubarsch und Ostertag, Ergebnisse der Allgemeinen Pathologie, etc., Dritte Abtheilung, 1896.

A CASE OF BRAIN TUMOR AT THE BASE OF THE SECOND LEFT FRONTAL CONVOLUTION,

WITH AUTOPSY; THE ONLY POSITIVE LOCALIZING SYMPTOM WAS AGRAPHIA UNCOMBINED WITH ANY FORM OF APHASIA.

BY HERMON C. GORDINIER, A.M., M.D.,
OF TROY, N. Y.,
PROFESSOR OF PHYSIOLOGY AND ANATOMY OF NERVOUS SYSTEM, ALBANY MEDICAL COLLEGE.

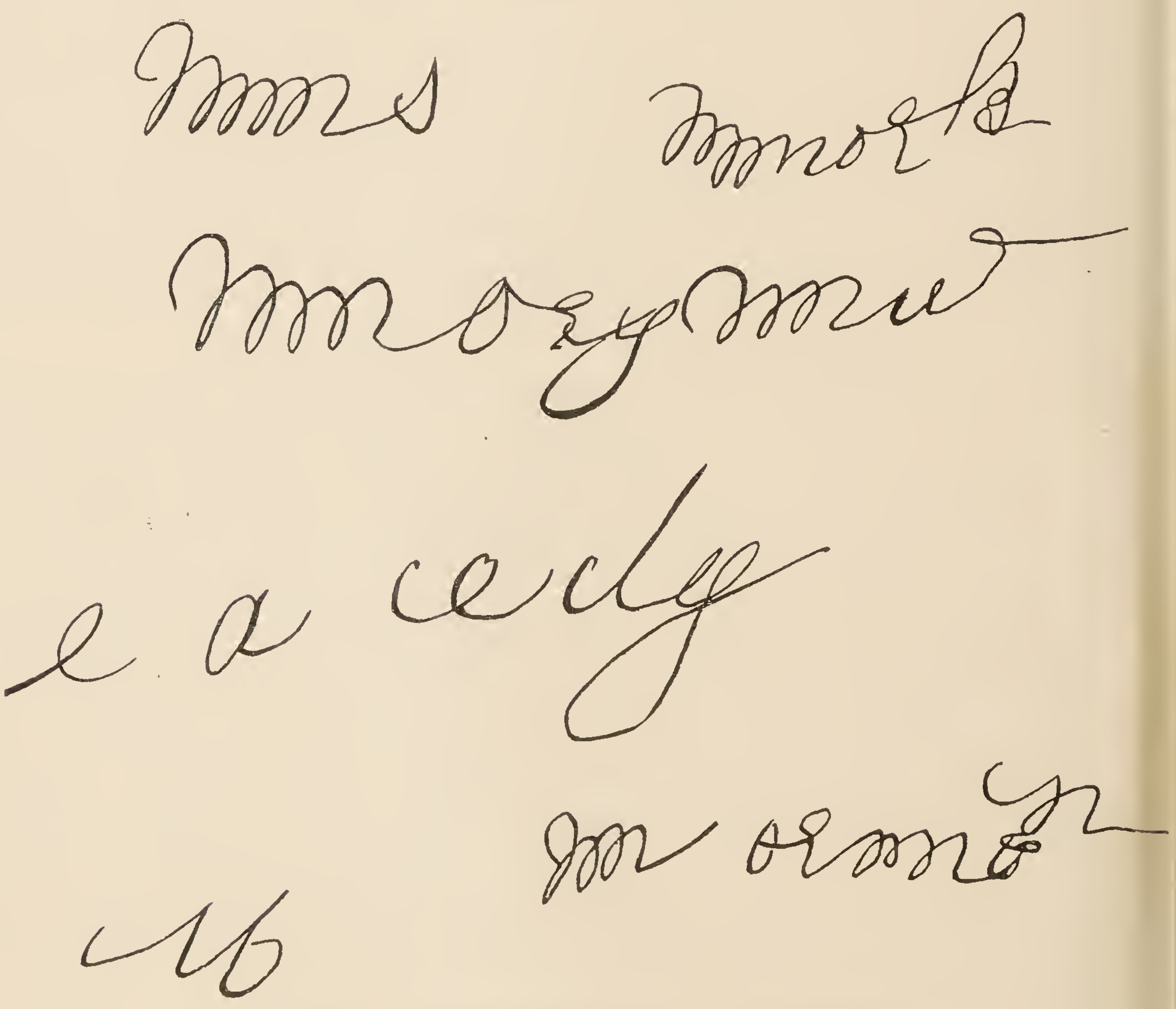
THIS very interesting and instructive case, the like of which I have not been able to find in medical literature, seems to prove the existence of a separate and distinct cortical centre for writing, having the same relation to writing movements as the motor speech centre has to speech movements. This centre is localized at the base of the second left frontal convolution for the right-handed, there probably being a centre of like character in the same location of the opposite cerebral hemisphere for the left-handed. Destruction of this centre produces pure motor agraphia without aphasia, and with no paralysis of the arm. It has long been supposed by Exner and his followers that such a distinct cortical centre existed, and its location was believed to be in close proximity to the motor speech centre, and probably at the base of the second left frontal convolution. But two cases of value have been recorded which support such a belief—those of Charcot and Dutil, and Eskridge, the latter being the nearest approach to the necessary requirements for the positive location of a writing centre in the above-mentioned position. In several cases of motor aphasia combined with agraphia that have come to autopsy the base of both the second and third frontal convolutions have been found diseased. A few cases of pure motor aphasia without agraphia have been recorded, the lesion being confined to the base of the third left frontal gyrus.

The patient, Mrs. Lizzie W., an intelligent Irish woman, received her education in the public schools. Her age is thirty-seven years, and she has been married for fifteen years. Has had five living children and one miscarriage at the third month. Her father died at the age of sixty years, of cancer of the face. Mother alive and in perfect health. Has a brother and sister living and in good health. Has lost two sisters, one of Bright's disease, the other from consumption. The patient had always enjoyed excellent health up to the onset of the present illness, which began about Christmas, 1897, when she began to fail in strength, and had several attacks of vertigo, without falling and unattended with nausea or vomiting. A short time afterward she developed severe frontal and occipital headaches, with occasional attacks of vomiting. The headaches continued with increasing severity until the fatal issue. In March, 1898, she noticed that her sight was failing, and that she could not read print without the use of glasses. At about the same time she began to complain of a numbness in the right arm. At no time during her illness did she have a unilateral or general convulsion. Her bowels have been rather constipated; she has had perfect control over her bladder. Has menstruated regularly and in a normal manner. Patient converses intelligently, makes no errors, and her memory for past and recent events is good. At no time during illness has she had the slightest difficulty in giving expression to her thoughts by articulate speech.

Examination, April 5, 1898: Patient 5 feet 4 inches in height, weight 140 pounds. Physical examination of the chest and abdomen elicited nothing abnormal. Urine normal; temperature 98.6° F.; pulse 68. Head well formed and perfectly symmetrical; no evidence of previous injury: no exostosis; percussion of scalp elicits no tenderness. Veins of forehead not prominent. Pupils moderately and equally dilated. Respond actively to light and accommodation. Wernicke's hemiopic pupillary phenomenon present. No hemianopsia; optic neuritis of both eyes, though most intense in right eye. Owing to paresis of the right external rectus muscle the right eyeball could not be rotated outward, but its movements upward, downward, and inward were found normal. Diplopia existed. Excursion of left eyeball normal. Color vision normal. Drum membranes appeared normal, hearing distance for watch in each ear was three feet. Movements of tongue normal, no fibrillation or atrophy. Senses of taste and smell normal. Soft palate and uvula move in a normal manner. No loss of sensation over buccal or pharyngeal mucous membranes. Movements of vocal cord perfect, no difficulty in swallowing. No stiffness of neck muscles or those of spine. Both sides of face symmetrically formed, no evidence of facial paralysis. Patient is able to perform in a normal manner symmetrical bilateral movements. Grip of right hand is slightly weaker than that of left. Dynamometer: outer scale, right, 50; left, 75. No muscular atrophy anywhere discoverable. No stiffness of muscles. Both fine and coarse movements of right and left hands and arms normal. Movements of lower extremities normal, the strength of both sides being alike. The most careful examination of the skin of the entire body showed no sensory disturbances. No œdema or other vasomotor changes. The most careful reinforcement failed to elicit the presence of patellar tendon reflexes.* No ankle clonus, superficial reflexes present, not exaggerated. No ataxia in upper or lower extremities. The sense of posture normal. Romberg's symptom absent. Patient's gait is perfectly normal. She has always been right-handed.

Speech. Patient recognizes and names correctly any object placed before her. She can recognize and accurately name, with her eyes closed, any familiar object when placed in her right hand, such as coins and the like. She understands perfectly what is said to her. She recognizes familiar hymns. She can repeat words after another, and speaks voluntarily without the slightest hesitation, and always correctly. She can read correctly with the aid of glasses ordinary sized print or writing. She recognizes numerals at once. The only difficulty present is a total inability to write. Although she understands perfectly written language and can read to herself or aloud, she cannot write voluntarily nor form correctly a single letter, and cannot write from dictation or copy. She holds the pen in a perfect manner, and performs movements with it as if to write, her writing consisting, however, of nothing more than a series of united curves. (Fig. 1). She was unable to write with her left hand, as she was not ambi-dextrous. The fine and coarse

FIG. 1.



An attempt to write her name—"Mrs. Lizzie Warwick."

---

* This absence of the deep reflexes has been noted by several observers in tumors of the frontal lobe.

muscular movements of the right hand are executed in a perfect manner, and there exists no paralysis of the muscles of the hand, forearm, or arm. Before the present illness began she could write perfectly. She showed me some of her writing, which was excellent.

Without the slightest external manifestation of a syphilitic infection, it was thought wise to give the patient the benefit of the doubt, and hence potassium iodide combined with mercury was administered for six weeks.

May 20th. After six weeks' continuous use of increasing doses of potassium iodide combined with mercury it was discontinued, there having been no amelioration of any symptom. No sensory or motor symptoms. No hemianopsia or alexia, voluntary speech perfect. Cerebration, which was very active at my first examination (the patient answering the numerous questions put to her very quickly and correctly), was now quite slow. This slowness of speech was not in any sense aphasic in character, as all questions were answered correctly, only there was considerable deliberation before the answers came. Memory good. There is an absolute inability to write voluntarily from dictation or to copy. The patient holds the pen or pencil in perfect position, and the movements of the forearm and hand are normal. Perfect control over sphincters. In no other particular was her condition different from that denoted above, save that there is a tendency to fall or to stagger toward the right side. This ataxia did not exist at the date of the first examination. The patient has noticed this condition for about three weeks, and she thinks it is becoming gradually worse. It is an inco-ordination similar to that of cerebellar disease, and is like that frequently observed in disease involving the prefrontal lobe.*

This condition of complete agraphia continued throughout her illness, and was, with the exception of a gradual development of a slow cerebration and frontal ataxia (Bruns), the only localizing symptom present. At no subsequent time was there found the slightest evidence of motor or any form of sensory aphasia. She never had a partial or complete unilateral or general convulsion, never became paralyzed or developed any sensory disturbance. Hemianopsia or alexia were never present. The presence of agraphia without motor aphasia, with a gradually increasing slow cerebration and ataxia, coupled with double optic neuritis, with severe and continuous headaches, unaccompanied with alexia, led to the diagnosis of a lesion of the prefrontal lobe, probably a new growth, the situation of which I was led to believe, owing to the fact that the slow cerebration and inco-ordination which developed subsequently to the agraphia, was at the base of the second frontal convolution of the left side.

After six weeks of further suffering, there being no change in her symptoms, she consented to an exploratory operation, which was performed July 19, 1898, by Dr. E. D. Ferguson, of Troy, N. Y. The left Rolandic area was exposed after the method of Reid, under strict asepsis. A trephine opening was next made through the middle third of this area. On removing the button of bone the dura bulged into and through the opening, forming a very elastic swelling, which pulsated feebly. On incising the dura there was an escape of a considerable amount of sub-arachnoid fluid, followed immediately by the formation of a troublesome hernia cerebri. The opening was now enlarged forward by the Ronguer forceps, and a careful search was made for a lesion, but none was detected. The cortical area exposed by trephine opening appeared normal. While discussing the propriety of enlarging the openings still more forward her condition became so alarming that it was decided to close the opening at once.

---

* The inco-ordination or ataxia which has been so frequently observed as a result of lesions of the frontal lobe is similar in character to that observed in cerebellar disease. The causation of this frontal ataxia is not as yet known. Wernicke, Oppenheim, and Bruns believe it to be due to the involvement of the centre for the trunk muscles, which centre has been placed by Monk in the posterior part of the prefrontal lobe. They think that it is not a true ataxia, but is a loss of equilibrium, the result of paresis of the trunk muscles.

This inco-ordination may possibly be attributable, as suggested by Bruns, to a partial or complete interruption of the fibres of the fronto-cerebellar tract, which brings into association the prefrontal lobe with the opposite cerebellar hemisphere.

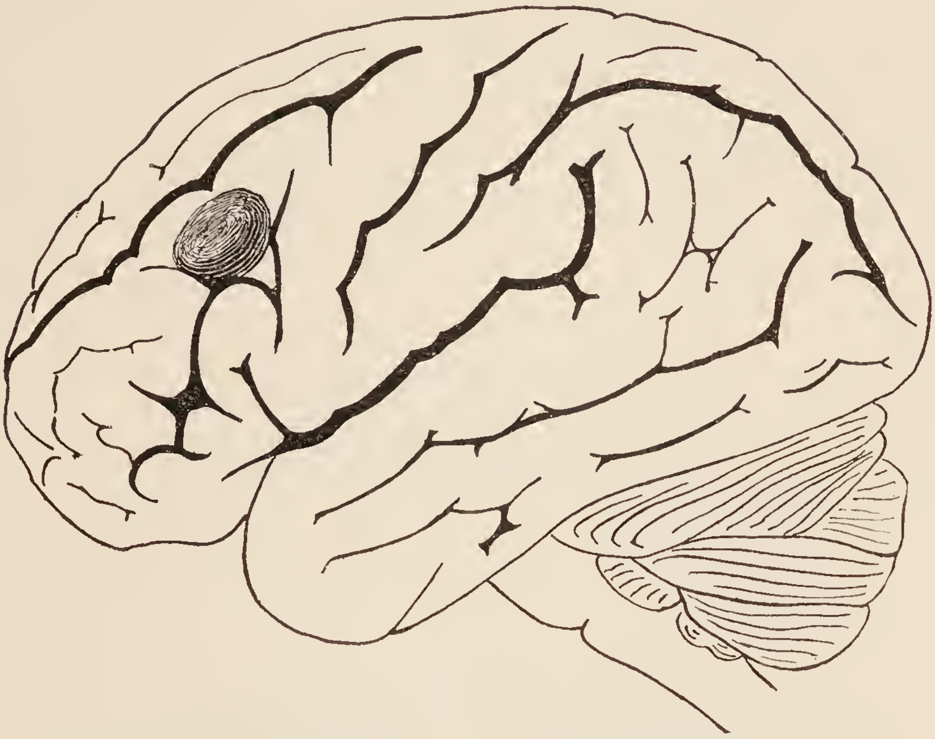
The vessels having been secured, the wound was closed with kangaroo-tendon, a gauze drain being left in the most dependent part.

July 20th, 1898. On awakening from her etherization it was discovered that her right arm was paralyzed. She appeared very drowsy and stupid, and complained of great pain in the region of the wound. She was unable to move the right arm, and the movements of the right leg were impaired.

July 21st. Patient rapidly passed into a condition of unconsciousness. No control over bladder; pulse rapid and very feeble; temperature 101°; expired at 4 P.M.

Autopsy, July 22, 1898, at 10.30 A.M. Only the head permitted to be examined. Trephine opening 4.5x4.75 cm. Elevation of hernia cerebri above dura was 2 cm. Dura everywhere free. Superior longitudinal sinus contained a soft, recent thrombus. Vessels of pia injected. Left cerebral hemisphere. Marked hemorrhagic softening of the hernia cerebri and surrounding brain tissue; pia not adherent save at location of new growth, which was found occupying the foot of the second left frontal convolution, being distinctly separated from the arm area by the precentral sulcus, which sulcus in this case was well developed. (Fig. 2.) The growth was elevated about one-half centimetre above the surrounding cortex; was slightly irregular in outline, of a distinctly firm consistency, and oval in shape. Its longest cortical diameter was 2 cm. The pia was intimately adherent to it. On section the tumor was seen to extend downward and inward in the centrum semi-ovale as far as the roof of the anterior cornu of the lateral ventricle, and forward to near the apex of the frontal lobe, involving almost exclusively the white matter of the second frontal gyrus. (Fig 3.) The left third or inferior frontal convolution throughout its whole extent was found (macroscopically) perfectly normal, as was its associated centrum ovale. The centrum ovale of the superior or first frontal convolution was toward its ventral part infiltrated by the growth. The motor convolutions in their middle third formed a part of the hernia cerebri; this area was filled with minute capillary hemorrhages, the result of the sudden relief of the intracranial pressure, resulting in a hemorrhagic softening. The rest of the motor area and the underlying white matter was found normal. The supramarginal and angular gyri, with their associated white matter, were very carefully examined and found normal, as were the convolutions and white matter of the occipital and temporal lobes. The basal ganglia and the internal capsule showed no naked-eye changes. The convolutions, centrum ovale, basal ganglia, and internal capsule of right cerebral hemisphere normal. The interior of the skull was found normal.

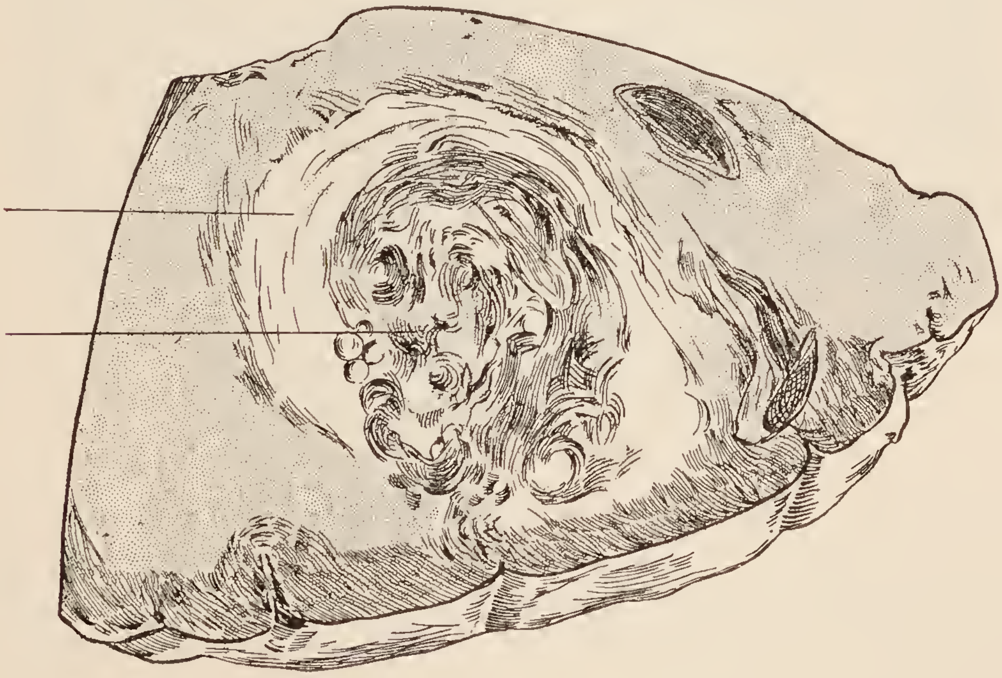
FIG. 2.



Diagrammatic representation of the cortical part of the tumor.

Histological examination. The histological examination of the tumor shows it to be a glioma of rapid growth. It is of a yellowish-gray color, rather firm in consistency, not very vascular, and is inseparably blended with the surrounding white matter. It presented no softened areas, and there is no softening of the white matter in advance of it. It is not at all cystic in character. Sections of the tumor were placed for four days in Orth's fluid and subsequently hardened in alcohols of increasing strength. Small cubes were embedded in celloidin and stained with hæmatoxylin and eosin, van Giesson's picric acid fuchsin

FIG. 3.

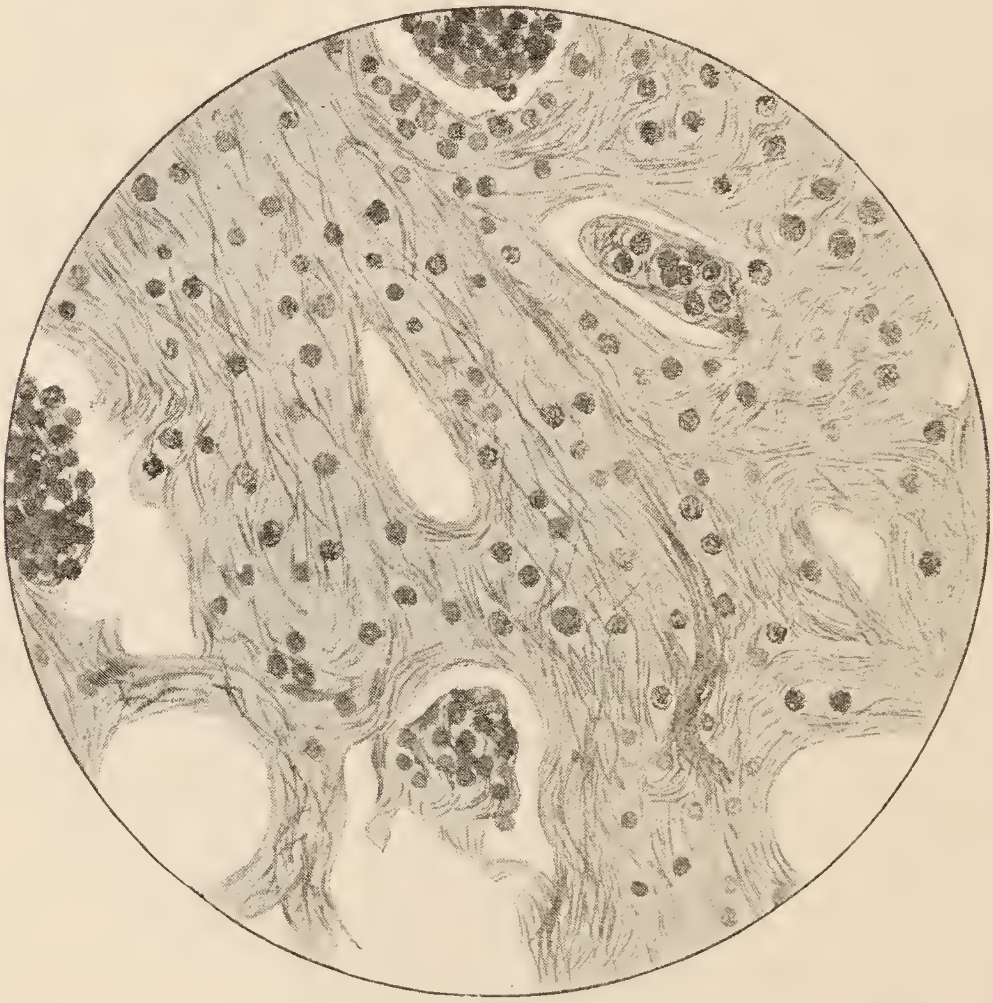


Transverse or frontal section through left præfrontal lobe, showing location of tumor in centrum semiovale of second frontal convolution.

and hæmatoxylin, Weigert's myeline stain, and with Mallory's phospho-molybdic acid hæmatoxylin and phospho-tungstic acid hæmatoxylin.

With a low power the growth is seen to be composed chiefly of a rather dense matrix of fibrillated tissue arranged into bundles of coarse and fine fibres. These fibres have no special direction, but course in various ways around and between the cells, the latter being arranged both in groups or distributed singly between the fibres. Bloodvessels are not very abundant, but are sparsely scattered throughout. Many of them present no thickening of their walls, while others show a distinct thickening, the result of a proliferation of their spindle-cells. In some situations between the bundles of fibres exist rather large, mostly circular, spaces, some being empty, while others were filled with a hyaline-appearing substance, which stained poorly and contained a few roundish cells the size of small leucocytes. Similar spaces have been observed by Taylor* in a gliomatous growth, and he thinks that they may be lymphatic in their nature.

FIG. 4.



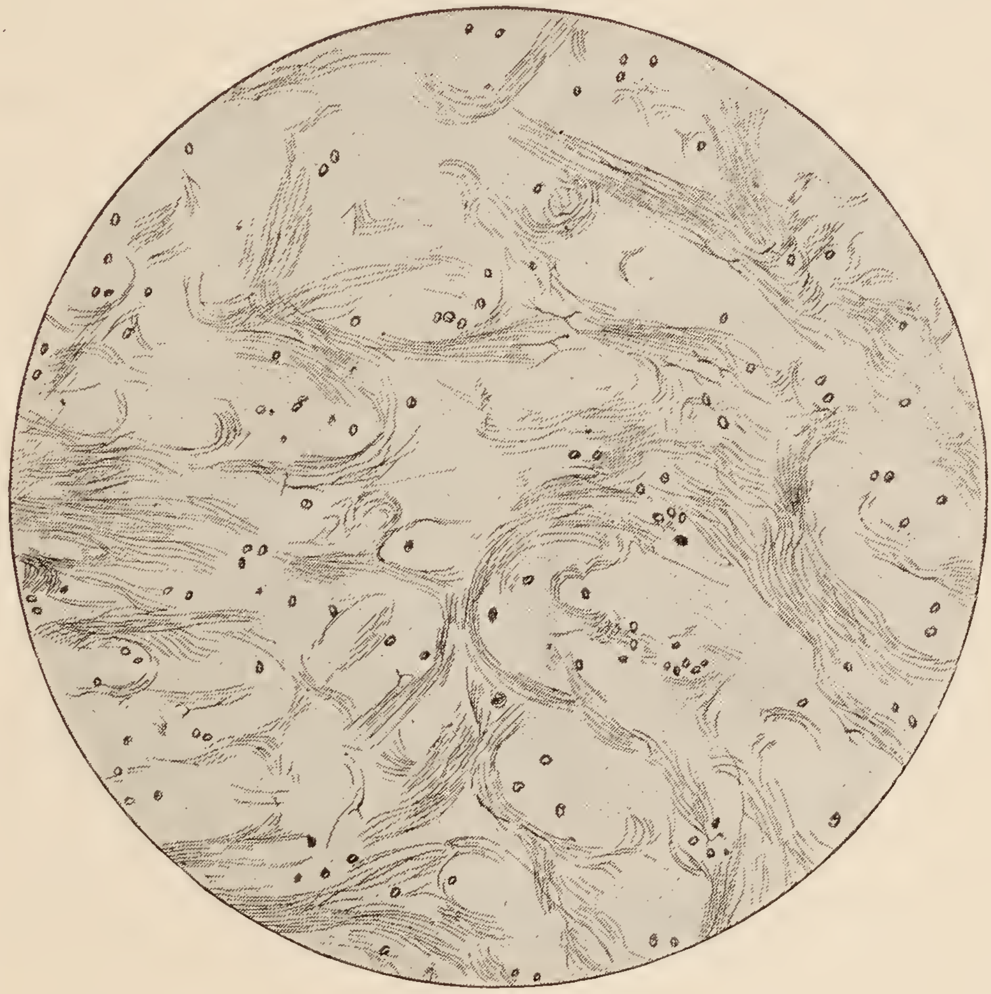
Section through the oldest part of tumor, showing dense reticulum of neuroglia fibres, with many neuroglia cells. Van Giesson's picric acid fuchsin method. Zeiss ocular 4. Objective 4 mm.

With a high-power, Zeiss apochromatic objectives 4.0 mm. and 2.0 mm , ocular 4, sections stained after the methods of van Giesson and Mallory show this mass of reticulated or fibroid-appearing tissue to consist in places of a dense and in places of a loose reticulum of coarse and fine neuroglia fibres, between which exist three distinct varieties of cells. The neuroglia in the older parts of the growth is arranged into dense bundles of rather coarse, evidently enlarged, fibres, between which bundles are groups of cells variable as to size and of a round or oblong shape. (Fig. 4.) These cells were granular, and contain small, mostly eccentrically placed, nuclei. About the bloodvessels existed an infiltration of nucleated round-cells, evidently escaped leucocytes. In the more recently infiltrated parts—*i. e.*, at the periphery of the growth and toward the adjoining white matter—one sees a preponderance of neuroglia fibres, much finer in character, interlacing with one another and forming a rather loose meshwork, between the fibres of which exist two forms of cells, those with and those without processes. (Fig. 5.) Those with processes are of an elongated spindle-shape, and give off at one or both poles fine, attenuated, mostly unbranched processes one or more times the length of the cell-body. Those without processes are round or oblong in shape, and placed between the differentiated neuroglia fibres. All these cells consist of a body of protoplasm, with usually a single nucleus placed toward its periphery. Typical neuroglia cells of the type of Deiter, with processes radiating from all parts of the cell-body, were not found. Normal ganglion cells were likewise unobserved in the growth.

---

* Journal of Experimental Medicine, November, 1897, page 611.

FIG. 5.



Section through the more recent part of the tumor, showing abundance of neuroglia fibres, with sparsely scattered cells. Mallory's phospho-tungstic acid hæmotoxylin stain. Reichert ocular 2. Objective $^{1}/_{5}$.

Microscopical examination of the left inferior or third frontal convolution, with its associated white matter, showed it to be normal.

The ventricles contained an excess of fluid. The brain stem, pons, cerebellum, medulla, and cranial nerves showed no macroscopic changes.

The question as to whether or not a separate and distinct centre for writing exists in the cerebral cortex has long been under discussion. Trousseau,[1] Jackson,[2] and Gairdner were among the first to approach the subject, they being led to believe, from the fact that agraphia and motor aphasia were so often associated, that writing was performed only through the medium of Broca's speech area, and that a separate and distinct centre for writing did not exist.

At the present time Déjèrine[3] is the most ardent advocate of the theory of the above-mentioned observers, even going so far as to cite cases in support of this view. His reports are, however, not at all conclusive, since no symptoms occurred which were not explicable in some other way. It is especially noticeable that several of the cases which he considers most positive never came to autopsy. Contrary to the view of the above-mentioned observers are the interesting cases, with autopsies, of Guido Banti,[4] Wadham,[5] and Byrom Bramwell.[6] In all of these typical motor aphasia existed without agraphia, and on autopsy only Broca's area was destroyed. Oppenheim,* of Berlin, has recorded a case of pure motor aphasia in which the patient was able to say only the words yes and no, but could write and paint through his entire illness. We can readily see, as pointed out by Bastian,† how a destructive lesion of Broca's centre can affect by extension the base of the second left frontal gyrus which lies just above it, and thus produce a symptom-complex with motor aphasia and agraphia. Several such cases with autopsies are now on record, among which may be mentioned the very interesting cases of Tamburini and Marchi,[7] and Simon.[8] On the other hand, we can readily conceive of a lesion affecting only the base of the second left frontal convolution and giving a complete agraphia as the sole localizing symptom. The wonder is that such cases have not been more frequently observed. Approximating such an ideal case are those of Charcot and Dutil[9] and Eskridge.[10]

The case of Charcot and Dutil seems perfectly simple if we could but prove that the oldest focus of softening was at the base of the second left frontal gyrus, which the clinical symptom agraphia indicates.

The case of Eskridge is much more complex and difficult of explanation. The patient exhibited, instead of pure agraphia, an inability to spell correctly, resulting in an unintelligible handwriting. At no time during his illness was he unable to form letters correctly; his difficulty was in transposing letters, words, and phrases. He realized his errors, but was unable to correct them, often making greater mistakes in such attempts. In addition to this it is extremely difficult to be positive of the exact boundaries of any cortical lesion by an examination through a trephine opening, as it is at times no easy matter to be perfectly sure of the exact position of certain fissures and gyri, even when the brain is removed and stripped of its pia.

---

* Oppenheim. Lehrbuch der Nervenkrankheiten, p. 458.

† Aphasia and other Speech Defects. Bastian.

In the author's case there can be no room for doubt that the cause of the complete agraphia was the destruction of the base of the second left frontal convolution, and that the slow cerebration and frontal ataxia which was developed later was due to the extension of the process further into the frontal lobe. The paralysis of the right external rectus muscle may have been due to the involvement of the area for the movements of the eyes and head, which is supposed, from experimentation and clinical verification, to be at the base of the first and second frontal gyri. It is a well-known fact that a lesion limited to the left angular gyrus will produce agraphia, but the agraphia is always accompanied with alexia, the agraphia being due to a loss of the activity of the left angular gyrus, which is necessary for the production of the memories of the appearance of written or printed words. Numerous cases with autopsies have been recorded to verify the above-mentioned statement, among which may be mentioned the cases of Bateman,[11] Amidon,[12] Hun,[13] Bernheim,[14] and Sigaud.[15]

BIBLIOGRAPHY.

1. Trousseau Clinical Lectures, 1866, p. 261.
2. Brain, 1878, vol. i. pp. 320 and 329.
3. Loc. cit., p. 85.
4. Afasia a sue Forme lo Sperimental, 1886, vol. ii. obs. 2, p. 270.
5. St. George's Hospital Reports, 1868, vol. iv. p. 245.
6 Lancet, 1897, vol. i., cases 1 and 12.
7. Rivista Sperimentali di Freniatria et di Medecina Legale, 1883, Anno ix. p. 282.
8. Ziemssen's Encyclopedia, vol. xiv. p. 735.
9. La France Médicale, 1878, p. 609.
10. Medical News, August 1, 1896.
11. Bateman on Aphasia, 1870.
12. New York Medical Journal, 1885, p. 113.
13 THE AMERICAN JOURNAL OF THE MEDICAL SCIENCES, January, 1887.
14. Hecht. Thèse de Nancy, 1887.
15. Segaud. Progrès Médical, 1887, p. 177.

SARCOMA OF THE TESTICLE.

CONCLUSIONS BASED UPON ONE HUNDRED AND FOURTEEN CASES.

BY GEORGE MARTIN KOBER, M.D.,
OF WASHINGTON, D. C.

PROFESSOR GURLT, in his onkological statistics, tells us that of 6,637 tumors which came under observation in the Vienna hospitals rom 1855 to 1878, there were 11,131 cases of carcinoma and 848 sar-
omas. Of the carcinomas 64, and of the sarcomas 45, involved the estis. On account of the comparative infrequency of sarcoma of the

testis, and an evident lack of statistical material based upon full clinical histories, I have collected all the cases I could find in German and English literature reported during the past eighteen years, with the hope of supplying some of the missing data.

Green and other pathologists hold that sarcomas are tumors consisting of connective tissue of a more or less embryonic type—in so far, at least, that cells predominate over intercellular tissue; and, since they always spring from connective tissue, they may occur wherever connective tissue is present, but it is still doubtful whether these growths start from adult tissue or from some embryonic remnant.

Certain histological and clinical differences have induced pathologists to divide sarcomas into several varieties. Thus, according to the predominant form of cell, we have four groups, viz., the round-celled, the spindle-celled, the mixed-celled, and the myeloid-celled. In the mixed-celled no special form predominates, and even the myeloid-celled is, strictly speaking, a mixed-celled sarcoma; but as the myeloid cells are frequently the most striking and numerous objects in the field, Green prefers to speak of it as a distinct group.

The nature of the stroma, whether mucus, fibrous, cartilaginous, or bony, has given rise to the names myxo-, fibro-, chondro-, and osteosarcoma; and since sarcomas may undergo secondary changes, and the chief peculiarities are reproduced in the secondary growths—as, for instance, the development of black or green pigments or fatty or calcareous infiltration—such varieties as melanosarcoma, chloroma, liposarcoma, and calcifying sarcoma have been recognized.

In addition to these the term medullary, encephaloid, or soft sarcoma is used; but they are only different names for the round-celled variety, which are of a softer consistence than the spindle-celled growth and often confounded with encephaloid cancer. The lymphosarcoma and alveolar sarcoma also belong to the round-celled variety, while in cystic sarcoma, in addition to the formation of a cyst there is also the development of sarcomatous elements in the structure of the growth. Sarcomas are classed among the most malignant new formations, and, as they infiltrate the surrounding structure, are apt to recur *in loco* after removal. This, however, does not appear to be the case with sarcoma of the testis, since of 114 cases tabulated by the writer the disease returned in the scrotum or in the inguinal canal in only eight instances (see Case VI. of my own collection, and Nos. 16, 42, 45, 77, 89, 106, and 107), and in these it may be assumed that there was an adherent scrotum or thickened cord at the time of the operation.

Generally speaking, the soft, round-celled, and large spindle-celled varieties are much more malignant and more liable to reproduce themselves in distant parts than the firmer, small spindle-celled growths.

Sarcomas, unlike carcinomas, usually show no tendency to affect the lymphatic glands; yet in the testicle, especially in young subjects, as first pointed out by Butlin, the disease involves the nearest glands with greater frequency than when it is situated in any other part of the body, unless it be the tonsil or some lymphatic gland. Indeed, from the frequency of abdominal metastasis, especially of the retro-peritoneal glands, we may conclude that in sarcoma of the testis the method of extension is similar to that of carcinoma; but, as in cancer, so here the dissemination may also be effected by means of the blood, as shown by the frequent secondary growths in the lungs, kidneys, spleen, and other parts of the body. The secondary tumors usually resemble the primary growths, but the several varieties may replace one another.

Causes. Injuries—such as blows, contusions, and squeezes, especially against the pommel of the saddle or in coitus—have been regarded as exciting causes of sarcoma of the testis; and in 32 of the 114 tabulated cases there is a distinct history of traumatism. In 18 cases the disease developed in retained testicles, or when the descent had been delayed; in one instance the retained testicle had been subjected to the additional pressure of a truss; in 2 cases there was a syphilitic history; in one instance the history shows mumps, with metastasis to a non-descended testicle; four of the cases were complicated with hernia, while in the others no special etiological factors are given. In the majority of the cases there is no history of traumatism, and in many of these the reporters assume that the patients were subjects of some new-growth diathesis.

The history of traumatism and retained testicle in 43 per cent. of the tabulated cases is of interest as tending to confirm the conclusions of pathologists that an injury or irritation may call into activity some fœtal relic or germinal rudiment, hitherto quiescent, or that the growth of the tumor may be due to some arrest in the development of the reparative material, which at a certain stage resembles more or less closely the tissue of sarcoma.

Age. Senn quotes Virchow as maintaining that sarcoma of the testis is most frequent in boys and in old men. I have not been able to verify this quotation; but in 107 of the 114 cases collected by me the ages were specified and were given as follows:

Age.	*Cases.*	*Age*	*Cases.*
3 months	1 [No. 49]	16 to 20 years	6
8 “	1 [“ 50]	21 “ 30 “	25
11 “	1 [“ 51]	31 “ 40 “	25
2 years	2 [“ 45, 75]	41 “ 50 “	26
2½ “	1 [“ 98]	51 “ 60 “	6
3 “	1 [“ 66]	61 “ 70 “	6
5 “	1 [“ 44]	71	1 [No. 42]
6 “	1 [“ 99]	74	2 [“ 54, 81]
10 “	1 [“ 79]		—
10–15 “	None.	Total	97
Total	10		

From this tabulation we conclude that only 9.3 per cent. of sarcoma of the testis occur between birth and the age of ten years. None of the cases occurred between the age of ten and fifteen; 5.6 per cent. occurred between the age of sixteen and twenty; 71 per cent. between the ages of twenty and fifty, and about 14 per cent. after the age of fifty.

In 21 of the 114 tabulated cases the seat of the disease was not specified; of the remaining 93 cases the tumor involved the right testicle in 47, the left in 41, and in five instances both testes (Nos. 1, 30, 45, 54, 83).

VARIETIES. In 39 of the 114 cases the histological character of the sarcoma was not specified; but as most of these cases occurred since 1880, and were reported from the well-known clinics of Berlin, Halle, Würzburg, and Greifswald, and by competent surgeons elsewhere, the general diagnosis of sarcoma may be accepted as correct. In the 75 cases in which the tumor was examined microscopically the classification was as follows:

Round-celled or medullary sarcoma	31	or	42.6 per cent.
Small round-celled sarcoma	9	"	12 "
Round and spindle-celled or mixed sarcoma	8	"	10.6 "
Cystic sarcoma	8	"	10.6 "
Alveolar sarcoma	7	"	9.3 "
Spindle-celled sarcoma	5	"	9 "
Lymphosarcoma	1		
Adenosarcoma	1		
Myxosarcoma	1		
Melanosarcoma	1		
Angiosarcoma	1		
Fibrosarcoma	1		
Myxochondrofibrosarcoma	1		
Total	75		

SYMPTOMS AND COURSE. Sarcoma, like carcinoma of the testis, develops rather rapidly, although a few remarkable exceptions showing a very slow growth of the tumor will be noted in the summary. Of 99 cases in which the duration of the tumor was stated it was as follows:

Congenital origin (Nos. 49, 50, 79, and probably 51 and 92)	5 cases.
From a few weeks to 6 months	28 "
" 7 months to 11 months	14 "
" 1 year to 2 years	24 "
" 2 years to 5 years	18 "
Of 6 years' duration	2 "
" 15 " "	2 "
" 16 " "	1 "
" 20 " "	3 "
" 23 " "	1 "
" 26 " "	1 "
Total	99

In most of the histories we find that the patients observed a gradual but painless enlargement of the testicle, lasting for an indefinite time, followed by a period during which, in the course of a few weeks, the tumor developed very rapidly, accompanied by a dull, aching, and sometimes lancinating pain. The rapid growth and the symptoms just referred to, together with a sensation of a dragging weight in the groin and loin, usually alarm the patient and induce him to seek surgical advice; but the innate modesty of man often deters him until the tumor has attained the size of an infant's head and the mischief has gone beyond all chance of real, permanent cure.

The tumor retains the shape of a normal testicle, and is therefore often mistaken for orchitis. It is only when the tunica albuginea has perforated that bosses and nodular projections appear. In some of the cases, however, when seen early enough, a limited induration, the starting-point of the disease, may be detected. The tumor is usually quite firm at first; but later, and especially in the more rapidly growing tumors, it appears soft, elastic, and even fluctuating; and since a certain amount of hydrocele is not uncommon, we need not be surprised that they are frequently mistaken for a collection of fluid, and tapped. Another remarkable feature of these growths, and one liable to lead to a mistaken diagnosis, is that there is not infrequently an apparent quiescence and in some instances an actual diminution in size of the tumor. The latter condition is, of course, explained by absorption of the fluid effusion.

Ulceration and true fungus hæmatodes are rare, because the coverings of the testis may be enormously stretched, and even when the tunica albuginea has yielded the scrotum expands for awhile; but it may finally become adherent to the growth, and ulcerate; this, however, happened only once in the 114 cases collected by the writer, showing that castration is usually performed before the tissues have yielded to the pressure.

With the growth of the tumor the spermatic vessels and scrotal veins enlarge; secondary deposits in or involvement of the cord are by no means frequent. Implication of the glands, however, such as those of the iliac and lumbar regions, is quite common in advanced cases, and may be detected by careful palpation along the brim of the pelvis and on either side of the vertebral column. Abdominal pain and tenderness, œdema of the lower extremities, a failing appetite, nausea, vomiting, jaundiced skin, cough, and bloody sputa point to secondary deposits in the abdominal organs or lungs, and death from exhaustion usually closes the scene.

Diagnosis. The diagnosis between the soft and rapid forms of sarcoma and carcinoma of the testis is almost impossible until the microscope decides the question; nor is it necessary to make a hair-splitting diagnosis, as the welfare of the patient demands ablation in every case of malignant testicular tumor.

The differential diagnosis between sarcoma and orchitis is by no means easy, for in both we may and often do have the history of an injury, and, as matter of fact, many of the sarcomas develop after an attack of orchitis. In the sarcomas, however, the growth is more slow, less painful, and the presence of the testicle cannot be so readily made out as in orchitis. When strapping and the use of mercurials and potassium iodide fail to effect a decided improvement, we may eliminate the diagnosis of traumatic or syphilitic orchitis, while the general appearance of the patient, and, above all, the absence of elasticity in the tumor, will aid us in recognizing a tubercular testicle. The presence of fluid in the tunica vaginalis and the indistinct fluctuation which accompanies the softening of the tumor may obscure the character of the tumor and lead to the diagnosis of hæmatocele or hydrocele. Kocher had such a case, and even Dupuytren removed an old hydrocele for malignant disease; and quite a large number of the cases reported here were tapped, showing that they were mistaken for a collection of fluid; indeed, in very many cases the diagnosis is not made until tapping has been resorted to. In all doubtful cases an exploratory incision should be made, followed at once by extirpation, especially if puncture of the tumor is followed by the flow of bright blood.

PROGNOSIS. The prognosis of all varieties of sarcoma is grave, and especially in children and in rapidly growing tumors. In 41 fatal cases collected by me the variety of the tumor was not specified in 13. Of the remaining 28 cases 11, or 39.2 per cent., belonged to the round-celled or medullary group; 3, or 10.7 per cent., were alveolar sarcoma; 5, or 17.9 per cent., cystosarcoma; 3, or 10.7 per cent., mixed sarcoma; 3, or 10.7 per cent., small round-celled sarcoma; 1, or 3.5 per cent., spindle-celled, and 1 each lympho- and fibrosarcoma.

The 41 fatal cases terminated as follows:

Died.	*Cause of Death.*
1 within 32 hours.	Septic peritonitis, showing also metastatic sarcoma of lung. No. 9.
1 “ 2 days.	Perforation of metastatic tumor of kidney. No. 28.
4 “ 15 “	Exploratory operation, abdomen and pelvis. Cases V. and 104. Secondary internal tumors in Case 22. Cause not given in Case 57.
8 “ 1 month.	Recurrence in internal organs in Cases Nos. 18, 20, 33, 68, 75, 89. Cause not given in Nos. 13 and 36.
4 “ 2 months.	Alleged phthisis, No. 24. Recurrence internal organs, Nos. 14, 98, 105.
3 “ 3 “	Cases I. and 52, abdominal tumors. Cause unknown, Case 26.
1 “ 4 “	Sarcoma of omentum. No. 31.
1 “ 5 “	Sarcoma of abdomen. No. 106.
3 “ 7 “	Sarcoma of abdomen and inguinal region. Nos. 5, 99, 107.
3 “ 8 “	Sarcoma of abdomen and inguinal region. Case VI. Nos. 23, 46.
1 “ 9 “	Recurrence, seat not stated. No. 37.
1 “ 10 “	Recurrence, abdominal. No. 66.
1 “ 11 “	Recurrence, abdominal. No. 73.
2 “ 12 “	Recurrence, lung, spleen. Nos. 34 and 100.
1 “ 16 “	Recurrence, abdominal. No. 53.
1 “ 18 “	Recurrence, lung. No. 21.
1 “ 21 “	Recurrence, ... No. 35.
2 “ 25 “	Secondary deposits. Nos. 4 and 82.
2 “ 36 “	Secondary deposits, lungs, Case III. Rectum, bladder, etc., No. 45.

The general prognosis after excision of the diseased testicle may be judged from the following data:

Of the 114 operated cases one case, No. 29, has been reported twice, leaving 113 cases to be disposed of. Of these we have no history of the ultimate result in 37 cases beyond the fact that the patients survived the operation and were discharged apparently well; but nothing is known of their subsequent condition; 41 patients died within a period varying from a few days to three years after the operation; indeed, 23, or 56 per cent., of the fatal cases perished within five months from secondary tumors in different organs, suggesting, at least, the probability that the operation had been deferred too long; 11 patients, or 27 per cent., lived from seven to twelve months after the operation; 5 patients, or 12 per cent., survived the operation from sixteen to twenty-four months, and 2 patients, or 5 per cent., survived the operation three years, but perished from secondary growths. Of the 35 remaining cases in which the end results are known the patients were alive, and the time elapsed since date of operation and of report was as follows:

18	1 to 12 months.		2	6 yrs. 6 mos,	No. 1, 30
2	13 months,	No. 7, 97	1	6 “ 9 “	“ 32
1	21 “	“ 38	1	8 “ 10 “	“ 27
1	24 “	“ 101	1	9 “	“ 103
1	25 “	“ 72	1	10 “	Case II.
1	36 “	“ 11	1	10 “ 6 mos.	No. 25
2	4 years,	“ 69. 71	1	15 “	“ 84

In one instance, No. 43, there was a recurrence of the disease six years after the operation; but the patient is reported as doing well seven months after the second operation.

From a careful analysis of the clinical histories we may conclude that the results of operative interference have been very gratifying, and the only treatment that offers any hope is prompt and radical extirpation, and this should be done without any special regard as to the malignancy of the tumor, since Adler has reported a case to the Berlin Medical Society (see *Trans.*, vol. xxv. pp. 164-166) in a man, aged twenty-four years, upon whom he performed castration May 11, 1892, and the tumor proved to be a cystadenoma. The patient died in September, 1893, from metastasis in the lungs of the same character, and not a trace of carcinoma or sarcoma could be detected.

In conclusion, I desire to express my obligations to Dr. D. S. Lamb for facilities extended in the study of the specimens in the Army Medical Museum.

No.	Reporter, date, and reference.	Age	Course and duration.	Operation.	Result.
1	Kraske. Centralb. für Chirurgie, 1880. iii.	42	5 yrs.; following contusion right testicle; left testicle enlarged 15 mos. after rapidly; castration of left; 3 mos. later right testis increased, also extirpated.	Castrat'n.	Sarcoma. Discharged two weeks after operation. 6½ years after second operation patient remained well.
2	De Beauvais Bull. Soc. de Méd. de Paris, 1880–1881, xv. pp. 171–175.	50	No details, induration affected cord.	Castrat'n	Sarcoma. No return after 8 months.
3	E. Ehrendorfer. Arch. für klin. Chirurgie, 1881-82, xxvii. pp. 336–373.	47	5 years' duration; right testicle.	Castrat'n.	Alv. sarcoma, micro. ex. Sup'ration and abdom.abscess Discharged 8 weeks after operat'n; no reply to subseq. inquiry; believed to have died, as extraperitoneal tumors could be felt in abdominal cavity.
4	E. Ehrendorfer. Ibid.	36	15 years' duration, after injury of left testicle; tumor increased rapidly.	Castrat'n.	Alveolar sarcoma. Mic.ex. Discharged 3 weeks after operation. Died 2 years after operation from secondary deposit.
5	E. Ehrendorfer. Ibid.	24	5 years ago left testicle in ing. canal began to enlarge and descend; rapid growth during last 2 mos.	Castrat'n.	Alveolar sarcoma. Mic. ex. Discharged 2 weeks after operation. Died 7 weeks after operation from secondary deposit.
6	E. Ehrendorfer. Ibid.	42	Several years, gradual enlargement of right testis; no injury.	Castrat'n.	Round-celled alv. sarcoma. Discharged 14 days after operation. No end results.
7	E. Ehrendorfer. Ibid.	40	1 year; left testis began to enlarge; no injury.	Castrat'n.	Round-celled alv. sarcoma. Discharged 15 days after operation. Patient perfectly well 13 mos. later.
8	E. Ehrendorfer. Ibid.	44	8 months duration; right testis; no injury.	Castrat'n.	Small r'd-celled sarcoma. Discharged 14 days after operation; no subsequent hist., but patient at time of discharge suffered from headache, ptosis, facial paralysis, and had a number of cutan. tumors from a pea to size of pigeon egg.
9	E. Ehrendorfer. Ibid.	46	16 years ago noticed swelling of right testis compl. ing. hernia; swelling increased rapidly during last 6 months; no injury.	Castrat'n.	Sarcom. carcinoma. Death 32 hours after operation; septic peritonitis, metast. in lungs also.
10	E. Ehrendorfer. Ibid.	18	1 year swelling of right testis, increased rapidly; no injury.	Castrat'n.	Spindle-celled sarcoma. Discharged 3 weeks after operation. No end result.
11	E. E. Wendt. N. Y. Med. Journ., 1881, xxxiii. pp. 626–632.	61	3 months before operation noticed swelling of left cryptorchis; increased rapidly.	Castrat'n, Feb. 26, 1878	Round-celled sarcoma. Discharged May 27, 1878; 3 years later no recurrence of the malignant disease.
12	H. F. Formad. Trans. Path. Soc., Phila., 1879–1881, 1882, p. 144.	17	1 year.	Castrat'n, Oct. 1880	Large spindle-celled sarcoma. No end result.
13	J. H. Brinton. Ibid., p. 145.	40	3 years; no injury.	Castrat'n, May 4, 1880	Large spindle-celled sarcoma. Patient died June 1, 1880.
14	J. H. Brinton. Ibid.	...	Recalled a case operated for sarcoma of the testis 3 or 4 years before.	Castrat'n.	Sarcoma. Wound healed readily, but in 9 or 10 wks. the retro-periton'l glands became involved, later those of the neck, and death occurred.
15	F. S. Gould. Trans. N. Y. Path. Soc., 1881, 1882, i. pp. 46–48.	24	7 months; injury of left testicle.	Castrat'n, Nov. 1, 1880	Micr. exam revealed enchondromatous sarcomatous, adenomatous, and cancerous structure. Patient still well Jan. 20, 1881.
16	Mr. Bellamy. London Lancet, 1882, vol. i. p. 392.	33	18 mos. before admission patient observed the left testis to enlarge; no injury; good family history.	Castrat'n, Dec. 15, 1881	Round-celled sarcoma. Disease involved cord; Jan. 5, 1882, patient doing well, but a small lump, size of almond, can be felt beneath skin of scrotum.

No.	Reporter, date, and reference.	Age	Course and duration.	Operation.	Result.
17	G.E. de Schweinitz. Trans. Path. Soc., Philada., May 23, 1884, vol. xii. p. 225.	37	2½ yrs. before patient first observed enlargement of left testis, which has grown rapidly last 8 mos., 14½″ in circumfer. time of operation; no syphilis. sister probably had a sarcoma of the orbit.	Castrat'n, May, 1884, by Dr. Ashhurst.	Round-celled sarcoma. No end-result.
18	G.E. de Schweinitz. Ibid., p. 226.	43	1 year before patient first noticed a globular swelling of left testicle; a short time previous to this had suffered with gonorrhœa, which was followed by an attack of orchitis; on May 22, 1884, examination revealed a very large tumor of the testicle, ing. glands of left side involved, and above the line of Poupart's ligament another mass in the left iliac fossa; patient begged for an operation.	Castrat'n, May 22, 1884	Round and spindle-celled sarcoma. Patient progressed very well a few days, when he died rather suddenly. Necroscopy showed commencing phthisis of apex of lungs, a pint of serum in left plural cavity: liver very fatty, heart normal; retroperiton. glands converted into a huge sarcomatous mass, also glands and tissues of the left iliac region.
19	G.E. de Schweinitz. Ibid., p. 223.	26	18 months before patient struck his left testicle, in mounting his horse, on the pommel of the saddle. In May, 1883, first observ'd enlargement, which, with pain and other symptoms, induced him to apply in Oct. 1883, for relief.	Castrat'n, Nov. 1883, by Dr. Brinton.	"Round and spindle-celled sarcoma." No end-result.
20	G.E. de Schweinitz. Ibid., 1885–1887, vol. xiii. p. 157.	...	In Dec. 1883, patient contracted syphilis. In Aug. 1885, first observed painless induration of testicle which rapidly increased with involvement of ing. glands.	Castrat'n, Nov. 1886	"Medullary sarcoma." Patient died 1 mo. after operation from secondary deposits in abdominal cavity.
21	H. Keil. Casuistische Beiträge zur ablatio testis, 8vo. Halle a S. 1886. Thesis.	29	2½ years ago noticed enlargement of right testis, increased rapidly during the last few months.	Castrat'n, Sept. 12, 1873	"Mixed sarcoma," Patient discharged Oct. 12, 1873, but died April 27, 1875, from metastasis in lungs.
22	H. Keil. Ibid.	19¼	Patient could only say that the left testis had enlarged very rapidly during a few months.	Castrat'n, May 4, 1875	Round-celled sarcoma. Pneumonia developed 3 days after operat'n; death May 11, 1875; numerous metastasis of internal organs.
23	H. Keil. Ibid.	27	15 months ago first noticed swelling of left testis, following a bruise; rapid increase during last few months.	Castrat'n, May 11, 1875	Cystic sarcoma. Patient discharged May 29, 1875, but died Jan. 1876, from internal tumors.
24	H. Keil. Ibid.	26	4 months before admission contusion of right testis; tumor developed since that time.	Castrat'n, Nov. 10, 1874	Medull. sarcoma. Patient died January 3, 1875, from alleged phthisis; no necropsy.
25	H. Keil. Ibid.	33	3 years before admission patient sustained contusion of the right testicle, since which time gradual growth of tumor.	Castrat'n, June 14, 1875	Sarcoma. Patient discharged June 26, 1875; letter received in Dec. 1885, reports himself still well.
26	H. Keil. Ibid.	32	6 months before admission left testicle began to enlarge; no injury or venereal disease.	Castrat'n, Mar. 14, 1876	Sarcoma with numerous cheesy deposits. Patient discharged March 30, 1876, but died several mos. later.
27	H Keil. Ibid.	41	3 years before, contusion of right testis, pommel of saddle; gradual growth and painful during last year.	Castrat'n, Jan. 30, 1877	Medull. sarcoma. Patient discharged Feb. 15, 1877, and is still well in December, 1885.
28	H. Keil. Ibid.	58	2½ years before admission severe contusion of left testicle; gradual growth, but more rapid and painful of late, with rapid emaciation.	Castrat'n, July 9, 1876	Sarcoma. Patient died two days after operation from perforation of a secondary kidney tumor.

No.	Reporter, date, and reference.	Age	Course and duration.	Operation.	Result.
29	H. Keil. Ibid.	42	6 years before admission, severe contusion of right testicle, which left some enlargement, which a year later had noticeably increased.	Castrat'n, Nov. 13, 1878	Round-celled sarcoma. Patient discharged 14 days after operation.
30	H. Keil. Ibid	42	The same patient was readmitted in July, 1879, stating that during the last 5 months a tumor of the left testis developed, which now was the size of a fist.	Castrat'n, July 17, 1879	Round-celled sarcoma. Patient discharged Aug. 15, 1879, and in Jan. 1886, remained still well.
31	H. Keil. Ibid.	28	8 months before admission patient noticed that a retained right testicle was beginning to enlarge.	Castrat'n, Jan. 2, 1879	Sarcoma. Patient discharged Jan. 24, 1879, but returned May 5, 1879, with abdominal tumor, from which he died.
32	H. Keil. Ibid.	35	9 months ago noticed enlargem't of right testicle; no apparent cause.	Castrat'n, Mar. 6, 1879	Medull. sarcoma. Patient discharged Mar. 28, 1879, and in Dec. 1885, still well.
33	H. Keil. Ibid.	23	1½ years ago noticed enlargement of left testis; no apparent cause; very large and rapid growth.	Castrat'n, Jan. 13, 1880	Cystic sarcoma. Wound healed nicely, but patient died Feb. 1, from abdom. tumor and pulm. œdema.
34	H. Keil. Ibid.	45	2 years duration of tumor; no injury.	Castrat'n, Aug. 16, 1880	Sarcoma. Patient discharged Aug. 21, 1880; died in 1881 from metastatic tumors of the lungs.
35	H. Keil. Ibid.	33	Several years ago noticed enlargement of a retained right testicle, which has grown very rapidly and painful during past 6 mos.	Castrat'n, Aug. 3, 1881	Sarcoma. Patient discharged Aug. 30, 1881, but died 21 months later from metastasis.
36	H. Keil. Ibid.	53	5 years before admission patient observed gradual and painless growth of the right testicle; no apparent cause.	Castrat'n, Apr. 26, 1882	Small-celled sarcoma. Patient discharg'd May 13, 1882, but died soon afterwards; cause not known.
37	H. Keil. Ibid.	29	During last 4 mos. patient felt a swelling of the retained left testicle in ing. canal, which is now the size of a fist and very painful.	Castrat'n, Jan. 28, 1884	Mixed sarcoma. Patient discharged Feb. 9, 1884, died 9 months later from metastasis.
38	H. Keil. Ibid.	29	1½ years ago noticed enlargement of his retained left testicle.	Castrat'n, Oct. 18, 1884	Round-celled sarcoma. Patient discharged 2 wks. after operation, and in July, 1886, was still free from disease.
39	H. Keil. Ibid.	44	6 months before admission sustained contusion of left testicle from the pommel of a saddle; swelling and pain subsided, but during the last 3 months tumor rapidly developed.	Castrat'n, Dec. 14, 1884	Sarcoma. Patient discharged 14 days after operation, and remains well in Dec. 1885.
40	H. Keil. Ibid.	27	6 months before admission patient observed painful enlargem't of right testis; no apparent cause.	Castrat'n, Mar. 20, 1885	Small-celled sarcoma. Patient discharged Apr. 3, 1885, and remains well to January, 1886.
41	H. Keil. Ibid.	36	6 months ago observed enlargem't of retained right testicle, with rapid and painful growth, complicated with hernia	Herniotomy and castrat'n, May 15, 1885	Round-celled sarcoma. Patient discharged 3 wks. after operation, and was still well in Dec. 1855.
42	C. H. Wilkinson. Texas Med. and Surg. Rec., Galveston, 1882, ii. pp. 14–24.	71	23 years before, *i.e.*, during the Indian mutiny in '57, while in the Eng. navy, received shell wound of left scrotum, after which gradual enlargement of testicle.	Castrat'n, Apr. 17, 1880	Sarcoma. Wound healed, patient discharged, but readmitt'd July 23, 1880, with tumor in left side near ing. region; patient died a few weeks later from sarcoma of the omentum.
43	L. C. Toney. St. Louis Med. and Surg. Journ., 1884, xlvii. p. 126; 1890, lix. pp. 81–84.	70	6 weeks before admission patient noticed a tumor of right testicle; no injury; pain, no syphilis; tumor size of goose egg.	Castrat'n, Apr. 1884	Rd. spindle-shaped celled cystic sarcoma. In Feb. 1890, the patient returned with a recurrence of the same disease, and another excision was performed; Aug. 1890, patient still well.

No.	Reporter, date, and reference.	Age	Course and duration.	Operation.	Result.
44	J. Schubert. Ein Tall von Hodensurcom bei einem 5 jährigen Knaben, 8vo. Greifswald, 1885.	5	6 months before admission little patient suffer'd from orchitis right side; Dec. 1884, patient fell and complained of pain in scrotum, which was the size of an apple.	Castrat'n, Jan. 27, 1885	Sarcoma. Boy discharged as cured Feb. 21, 1885. No end-result.
45	J. Schubert. Ibid.	2	6 months before admission at the Dresden Clinic in 1883, tumor observed in left testicle.	Castrat'n, Aug. 3, 1823	Medull. sarcoma. Patient discharged Sept. 1823, readmitted Jan. 1824, oper. Feb. 8, 1824; continued well until May, 1824, when tumor was discovered in right testicle; extirpation May 6, 1824; local recurrence after a few days; died July 1, 1827. Necroscopy: Sarcom. growth in left ing. region involving part of rectum, bladder, mesentery, etc.
46	Sidney Jones. The Lond. Lancet, 1885, vol i. pp. 425–427.	21	9 months before admission patient first observed a small hard lump in right testicle, which slowly increased; 4½ months ago patient injured this testicle, followed by rapid swelling, tumor 11¾ in. in circumference.	Castrat'n, Jan. 30, 1884	Small round-cell'd sarcoma. Patient discharged Feb. 1884, readmitted Oct. 7th, and died Oct. 29, 1884. Necroscopy revealed metastatic tumor of the same character within inguinal canal and abdom. cavity.
47	Sidney Jones. Ibid.	51	5–6 years before admission patient received a blow on his right testicle, swelling since, steadily increased 18 months ago; circumference 10 inches.	Castrat'n, April 9, 1884	Small round-cell'd sarcoma Patient discharged Apr. 28, 1884, wound healed. No end-result.
48	Sidney Jones. Ibid.	36	9 mos. before left testicle began to enlarge without injury and syphilis.	Castrat'n, Sept. 24, 1884	Sarcoma. Patient discharged Oct. 8, 1884. No end-result.
49	R. W. Parker. Trans. Path. Soc., London, April 7, 1885, vol. xxxvi. p. 299.	3 mo.	The testicle at the time of birth was the size of a walnut, until, at the time of extirpation, it was the size of a hen's egg.	Castrat'n.	Congenital adenosarcoma. No end-result.
50	Mr. Owen and Silcock A. Quary. Ibid., Apr. 7, 1885, p. 301.	8 mo.	Left testicle enlarged at time of birth, gradually increased in size to date of admission in July, '84, when it was 3 or 4 times larger than the right, which was normal.	Castrat'n. July, 1884	Congenital sarcoma. Little patient lost sight of. No end-result.
51	Mr. Owen and W. C. Chaffey. Ibid., Apr. 7, 1885, p. 302.	11 mo.	Mother 5 days before admission noticed enlargement of testicle.	Castrat'n, Dec., 1884	Round-celled sarcoma. No end-result.
52	F. Schuckmann. Das Sarkom des Hodens 8vo. Würzburg, 1885, Thesis.	40	6 months before patient noticed enlargement of right testicle, which rapidly increased; no injury.	Castrat'n, June 14, 1884	Round- and spindle-celled sarcoma. Patient discharged July 23, 1884. No end-result.
53	J. Murphy, Rep. Prov. Northumb and Durham Med. Soc, Newcastle-on-Tyne, 1885–86, p. 151; 1886-1887, pp. 165–169.	22	1 year before admission patient observed enlarge- of left testicle; not painful, gradual growth at first, more rapid afterward; tumor when excised weighed 1 lb. 1 oz.	Castrat'n, Feb. 16, 1885	Cystic sarcoma. Wound practically well in March, 1886, but about the middle of April, patient revealed an abdom. tum. reaching almost to the umbilicus. Died June 9, 1886; a large sarcoma occupied almost the whole abdomen..
54	J. Murphy. Ibid.	74	4 months before consulting Dr. Murphy, patient observed swelling of right testicle without apparent cause, which in a few weeks was followed by enlargement of the left testis; both continued to increase in size until the right was as large as a coccoa-nut, and left similar, but smaller.	Castrat'n, Dec. 10, 1886	Small round- and spindle-celled sarcoma. Patient returned to his home a fortnight after operation, and up to Sept. 1887, continues well, but Dr. M. fears a return.

No.	Reporter, date, and reference.	Age	Course and duration.	Operation.	Result.
55	D. Maclean. Physician & Surgeon, Ann Arbor, Mich., 1886, viii. p. 162.	41	15 mos. before admission patient fell astride a fence and bruised his right testicle; under treatment he appeared to recover fully, but within the past few months the swelling returned, with formation of an abscess which discharged without surgical interference, but left a tumor size of a man's fist.	Castrat'n, Oct. 8, 1885	Sarcoma. Patient discharged Nov. 7, 1885. No end-result.
56	E. Seyler. Zur Casuistic der Hodensarcoma 8vo. Greifsw..'87. Thes.	50	A few weeks before admission patient noticed enlargement of left testicle; no pain, no injury.	Castrat'n, April 7, 1887	Round celled sarcoma. Wound healed kindly. No end-result.
57	G. McClellan. Trans. Path. Soc., Philada., May 26, 1887, xiii. p. 159.	65	Growth removed by Dr W. L. Atlee, involving epididymis and cord; no details	?	Sarcoma. Death occurred within a week after operation.
58	G. McClellan. Ibid.	27	Growth appeared to have followed a blow upon the testicle.	?	Sarcoma involving the entire testicle. No end-result.
59	Von Kahlden. Münch. med. Wochenschrifft, 1887, No. 31.	44	During past year dragging pain in the abdomen located near the umbilicus; tumor of left testicle in abdom'n diagnosed; right testis could not be found, but cord terminated in a large tumor.	Castrat'n.	Large celled myxosarcoma weighing 5960 grammes. No end-result.
60	T. S. Westcott. Trans. Path. Soc., Phila., 1887–1889, 1891, xiv. p. 206.	54	One year before kicked in the privates, but soon forgot injury; 5 months ago noticed tumor of left testis, and 2 weeks ago the right gland began to enlarge.	Castrat'n.	Alveolar sarcoma. No end-result.
61	A. Eder. Aertzl. Ber. der Privat Heilanstalt. d. Dr. A. Eder, 1887. Wien, 1888, pp. 81–83.	37	During his remembrance knew of a swelling in left ing. canal size of pigeon egg, which was movable until, about 2 mos. ago, it began to swell rapidly until Aug. 27, '87, the tumor in left ing. canal had attained the size of a fist.	Castrat'n.	Sarcoma. Patient discharged Sept. 17, 1887. No end-result.
62	F. M. H. Seemann. Ueber Castration bei retinirten Hoden 8vo Berlin, 1888, Thesis.	50	Retained left testicle in inguinal canal complicated with hernia. Virchow & Hirsch, Jahrg. 1881, ii. p. 234.	Castrat'n.	Medull. sarcoma. Tumor weighed 985 gr. No end-result.
63	F. M. H. Seemann. Ibid.	38	Retained right testicle during past 6 months enlarged until size of fist.	Castrat'n.	Sarcoma. No end-result.
64	H. Hugger. Pathol. anatom. Beitrag zur Kenntniss der Hoden-Sarcoma, 8vo Wurzburg, 1888. Thesis.	33	2½ years before admission sustained a severe contusion of right testis, followed by inflam. swelling which was relieved, but a few weeks later swelling recurred without pain; since the early part of January 1886, increase in growth more rapid.	Castrat'n, Mar. 15, 1888	Alveolar round-celled sarcoma. Patient discharged April 10, 1888; no recurrence to August, 1888.
65	H. R. Wharton. Trans. Path. Soc., Philada., Feb. 28, 1889, vol. xiv. p. 208.	...	4 years before patient first observed swelling of right testicle; no pain; tapped twice and again on Oct. 1888; since last tapping tum. has become painful and increased rapidly.	Castrat'n, Feb. 10, 1889	Spindle-celled sarcoma. No end-result.
66	Paul K. G. Stenger. Ueber Hoden. Tumoren im anschluss an die im Königl klin. zu Berlin vom Apr. 1, 1883. bis Apr. 1, 1889, oper. Fälle, 8vo Berl. '89, Thes.	3	Tumor of left testicle one year's duration; inguinal glands involved.	Castrat'n, April 4, 1884	Sarcoma. Patient died Feb. 7, 1885, from metastatic abdominal tumors.

No.	Reporter, date, and reference.	Age	Course and duration.	Operation.	Result.
67	Paul K. G. Stenger. Ibid.	42	6 months before admission observed swelling of right testis; now size of a man's fist.	Castrat'n, May 21, 1884	Sarcoma. Patient discharged May 31, 1884. No end-result.
68	Paul K. G. Stenger. Ibid.	30	1 year before patient noticed swelling of left testis, gradually increasing, extending to ing. canal.	Castrat'n, Mar. 26, 1885	Sarcoma. Patient discharged April 6, 1885, but died the same month from metast. abdom. tumor.
69	Paul K. G. Stenger. Ibid.	63	Tumor of left testicle of 7 weeks' duration, now as large as a goose egg.	Castrat'n, Jan. 12, 1885	Sarcoma. Patient disch'd Jan. 21, 1885; no return up to 1889.
70	Paul K. G. Stenger. Ibid.	42	Tumor of right testicle one year's duration, now size of a child's head.	Castrat'n, Mar. 10, 1885	Sarcoma. No end-result.
71	Paul K. G. Stenger. Ibid.	41	Tumor of right testicle of 7 months' duration.	Castrat'n, June 20, 1885	Sarcoma. Patient disch'd July 1, 1885; no return up to 1889.
72	Paul K. G. Stenger. Ibid.	39	Tumor of right testicle ¾ years' duration, now size of hazelnut	Castrat'n, Dec. 6, 1886	Sarcoma. Patient disch'd Dec. 1886; no return up to 1889.
73	Paul K. G. Stenger. Ibid.	40	Tumor of right retained testicle, one year's duration, now size of fist.	Castrat'n, Oct. 8, 1887	Sarcoma. Patient disch'd Nov. 22, 1887, but died Oct. 1888, from abd. récidiva.
74	Paul K. G. Stenger. Ibid.	46	Tumor of left testis of 4 months' duration, pyriform, extending to the inguinal canal.	Castrat'n, Jan. 10, 1888	Sarcoma. Patient disch'd, and up to 1889 no relapse.
75	Paul K. G. Stenger. Ibid.	2	Tumor of right testicle, began 1½ years ago, after delayed descent of testis; tumor now size of goose egg.	Castrat'n, Aug. 31, 1888	Sarcoma. Patient disch'd, wound healed, Sept. 1888; died 3 weeks later from récidiva in abdomen.
76	Paul K. G. Stenger. Ibid.	62	Tumor of left testicle two years' duration; now size of fist and extending to inguinal canal.	Castrat'n, Oct. 2, 1888	Sarcoma. patient disch'd Oct. 15, 1888, and no relapse up to 1889.
77	W. Rose. Med. Press and Circular, Lond., 1889. No. 5, xlvii, p. 287.	24	Over a year ago right testis contused, causing intense pain, since when tumor rapidly developed.	Castrat'n, April, 1888	Sarcoma. Patient disch'd, but disease recurred 10 months later in the right groin, and was excised. No end-result.
78	Beatson. Glasgow Med. Journ., 1890, xxxiii. p. 383.	40	11 mos. before admission patient observed a swelling in his right groin, testicle undescended; rapid growth of tumor, which increased to 15″ in circumference.	Castrat'n, Nov. 16, 1889	Sarcoma. No end-result.
79	J. B. Deaver. Trans. Path. Soc., Philada., June 12, 1890, vol. xv. p. 235.	10	Scrotum has always been abnormally large and has been treated without effect; 10 days before sustained kick upon left testicle, since which time rapid increase in size.	Castrat'n, June, 1890	Sarcoma of telangiectatic type. The boy left hospital apparently well. No end-result.
80	Roddick. Montreal Med. Journ., 1890–91, xix. p. 842.	40	Patient first observ'd swelling of testicle 2 years ago, for which scrotum was tapped 9 times; no injury or syphilis.	Castrat'n, Feb., 1891	Large round-celled sarcoma. No end-result.
81	A. H. W. Herfarth. Die Geschwültze d. Scheidenhäute des Hodens, etc., 8vo. Marburg, 1891, Thesis.	74	20 years before admission patient observed swelling of right testicle, which in July, 1890, had attained the size of a child's head.	Castrat'n, July, 1890	Myxochondrofibro-sarcoma. No end-result.
82	C. Heath. Lancet, London, 1891, i. pp. 71–73.	...	In a clin. lect. referred to, an officer from India from whom he removed a few years ago a testicle which was distinctly cystic and also sarcomatous.	....	He got perfectly well, and returned to India, but died within 2 yrs. with growth in neck and chest, and with the ordinary history of sarcoma developing in other parts of the body.
83	Rydygier. Archiv für klin. Chirurg., xvii. p. 769.	42	Tumor in right testicle.	Castrat'n.	Melanosarcoma. 4 weeks after operat'n the patient, who is a physician, complained of pain in left testicle, which was also excised; 40 days after no relapse.

No.	Reporter, date, and reference.	Age	Course and duration.	Operation.	Result.
84	Fischer. Zeitschft. f. Wundärzte u. Geburtshilf. Fellbach, 1891, xlii. pp. 27–29.	48	Several years ago patient observed enlargement of of right testicle, occasionally lancinating pains	Castrat'n, Mar. 23, 1873	Cystic sarcoma. 15 years after operat'n no récidiva.
85	J. Hofmokl. Bericht d. k. k. Krankenanstalt Rudolph Stiftung in Wien, 1891–92, p. 384.	51	As a boy suffered from traumatic orchitis, and 15 yrs. ago observed swelling and induration of left testis, which gradually increased, and painful after taking cold.	Castrat'n. May 4, 1891	Large celled cystosarcoma. Patient discharg'd May 26, and up to June 30, 1891, no return.
86	T. Fiaschi. Australas. Med. Gazette, Sidney, 1891–92, xi. p. 435.	44	Born a cryptorchid, and left testicle could always be felt in lower part of abdominal walls a little above Poupart's ligament; 12 mos. ago, while erecting a bridge and working 26 days in water, testicle began to swell and cause pain.	Castrat'n, Sept. 17, 1892	Round-celled sarcoma. Patient left Sydney 17 days after operation.
87	A. Keller. Das Cystosarcoma testis, 8vo Würzburg, 1892, Thesis.	30	Tumor attained very rapidly size of two fists, but quite painless.	Castrat'n.	Cystosarcoma. No end-result.
88	Farewick. Ueber Tumorenbildung bei Leisten und Bauchhoden, 8vo Bonn, 1893. Thesis.	30	Patient a month before first felt pain in abdomen; tumor of right retained testicle suspected.	Laparotomy, Oct. 31, 1892, tumor removed.	Mixed sarcoma. Patient discharged Dec. 9, 1892; in Jan. 1893, some induration in right ing. region, but not regarded as due to a recurrence.
89	Farewick. Ibid.	38	Also reports Maydl's case, Allg. Wien. Med. Zeitung, 1885, No. 47, of a tumor of retained right testicle in inguinal canal which developed rapidly.	Remov'd.	Medul. sarcoma. Several weeks after removal there was recurrence of the disease; another operation; died within a few days.
90	M. Jahrmärker. Zur Casuistik der Hodentumoren, 8vo Halle, a S., 1894, Thesis.	68	4 yrs. ago patient observed swelling of testicle without apparent cause; painful tumor tapped, better for 3 months, after which swelling increased more rapidly; treated a number of times by tapping.	Castrat'n, July 12, 1893	Round-celled sarcoma. Patient discharged Aug. 1, 1893, and no return of disease up to March 6, 1894.
91	H. H. Williams. Indian Med. Rec., Calcutta, 1894, vi. p. 371.	50	Admitted a Hindoo to Gen. Hosp., Lucknow, Dec. 17, 1893, for fibro-cystic dis. of left testicle of 26 years' standing and reaching to nearly his knees; free incision liberated 6 pints of purulent fluid, and testicle in sarcomatous state.	Castrat'n, Dec. 18, 1893	Suppurative sarcoma. Patient discharged Jan. 27, 1894, greatly improved in health and weight.
92	J. A. Fink. Ibid., p. 111.	45	Growth of right testicle noticed since childhood, and steadily increasing until size of a fœtal head.	Castrat'n, Oct. 12, 1893	Sarcoma. Patient disch'd Nov. 17, 1893, and in May, 1894, was still free from recurrence.
93	E. W. Walker. Cincin. Lancet Clinic, 1894, No. 5, xxxii. p. 173.	20	8 mos. before while scuffling patient was kicked in testicle, since which it has gradually enlar'd and grown painful; confined to bed for 9 weeks; tumor removed and found complicated with omental protrusion.	Castrat'n, January, 1894	Spindle-celled sarcoma. No end-result.
94	E. W. Walker. Ibid.	...	Tumor developed in undescended testicle, which had been subjected to pressure of a truss.	Laparatomy.	Spindle-celled sarcoma. Tumor removed from abdominal cavity; perfect recovery.
95	E. W. Walker. Ibid.	...	Tumor developed in testicle after being struck with a base-ball.	Castrat'n.	Sarcoma. No end-result.
96	C. A. Morton. Brit. Med. Journ., London, 1894, vol. ii. p. 980.	38	3 months before admission observed swelling of right testis, without injury, which has since increas'd rapidly.	Castrat'n, July 12, 1894	Round-celled sarcoma. No end-result.

No.	Reporter, date, and reference.	Age	Course and duration.	Operation.	Result.
97	M. Lawrie. Ibid., 1895, vol. i. p. 15.	29	6–8 months before admiss. patient noticed swelling in right testicle, which latterly has increased rapidly, with dragging pain in groin and hip.	Castrat'n, Oct. 21, 1893	Round-celled sarcoma. Patient alive and well Nov. 11, 1894.
98	F. Scheel. Ein Fall von Hodensarcom bei einen 2 jährigen Knoben 8vo Berlin, 1895. Thesis.	2⅓	2 mos. before a swelling of right testicle was observ'd which the attending physician treated as hydrocele; a month later tumor was the size of a man's fist.	Castrat'n, May 30, 1895	Fibrosarcoma. Wound healed by first intention; July 8, 1895, patient suffered from involuntary evacuation of bowels and bladder, which led to examination of abdom., and discovery of a tumor in the right iliac region the size of an apple; 3 weeks later, at time of report, tumor was size of a man's fist.
99	F. Scheel. Ibid.	6	1 month before patient contused his left testicle, followed by rapid swelling.	Castrat'n, Oct. 12, 1878	Spindle-celled sarcoma. Patient discharged Oct. 28, 1878, but readmitted Mar. 12, 1879, for tumor in left hypogastric region; patient died May 19; abdominal sarcoma weighed 3600 grammes.
100	E. Lamphear. Amer. Journal Surg. and Gynec., Kansas City, 1895–1896, vii. p. 3.	46	Several yrs. before patient noticed enlargement of right testicle with dragging in cord; no venereal disease or injury, but in the autumn of 1890 patient fell and bruised this testicle, since which time it has grown rapidly.	Castrat'n, Sept. 19, 1892	Cystic sarcoma. No further trouble in the scrotum, but a year or more afterward, the man received a blow in the left side over the spleen, and sometime later a splenic tumor develop'd, and I was written to from California, to which State he had removed. I advised immediate splenectomy, which was rejected, and the patient died.
101	C. Lauenstein. Deutsche Zeitsch. für Chir. Leipzig, 1896, xliii.	38	At the end of the year in 1893, patient sustained a bruise of the left testicle, which resulted in a gradual swelling, which has increased within the last few weeks quite rapidly, and is now the size of a chicken egg.	July 27, 1894	Sarcoma. High operation; patient alive and doing well at the time of report.
102	C. Lauenstein. Ibid.	31	Patient sustained an injury of the testicle 9 mos. before, which resulted in a tumor the size of a goose egg at the time of oper'n.	Sept. 2, 1895	Sarcoma. High operation; patient well at the time of report.
103	J. B. Pike. Lond. Lancet, 1897, vol. ii. p. 1530.	...	Patient admitted Apr. 8.'97, for abdom. tumor, which, upon operation April 28, proved a typical round-celled sarcoma of right undescended testicle, weighing 3 lbs. 6 oz.	April 28, 1897	Round-celled sarcoma. At the time of report, Dec. 11, 1897, patient was in good health.
104	O. E. Balloch. Trans. Med. Soc. Dist. Columbia, Dec. 9, 1896.	20	In July, 1896, noticed a lump in the lower part of the abdomen, pain running from the right loin toward the bladder; gradual increase in growth; up to the age of 8 years both testicles were in the scrotum; at that time the left testicle receded, and has not been down since.	Operat'n, Sept. 4, 1896	Abdom. opened for exploration: Peritoneum thickened and traversed by distended veins; tum. densely adherent to bladder, rect'm and pelvic walls; part of tum. broken down. Case was not deemed one for operat'n, and the abdom. was accordingly closed. Patient died Sept. 19, 1896. Micro. exam. showed tum. to be a round-celled sarcoma; no evidence of testicle structure in the mass.
105	Adler. Verh. der Berliner med. Gesellschaft, 1894–1895, xxv. pp. 164–166.	19	Admitted into hosp. Jan. 1893; 3 weeks before patient noticed a swelling of left testicle, no pain; tumor size of a closed fist.	January, 1893	14 days after operation, enlargement of retro-peritoneal glands which grew rapidly. Patient died 8 weeks after the operation. "Spindle-celled sarcoma."

No.	Reporter, date, and reference.	Age	Course and duration.	Operation.	Result.
106	Wm. B. Coley 20th Century Practice of Medicine. vol. xviii. p. 588.	22	Family history good ; previously in perfect health ; received injury to left testicle from bicycle fall, July 1, 1896 ; within 1 w'k he noticed an increase in size, but growth was not painful ; in Aug. 1896, tumor had reached the size of a fist.	May, 1897	Recur'nce followed in May, second operation in June, 1897 ; there quickly followed abdom. recurrence; the patient lost flesh and strength very rapidly, and died early in Oct. 1897. "Round-celled sarcoma." Autopsy showed narly all the abdominal organs extensively involved.
107	Wm. B. Coley. Ibid.	29	Patient injured left testicle during a bicycle fall in Aug. 1896 ; a swelling appeared in the injured part in September, and increased rapidly in size.	June, 1897	First operation by Dr. Millbank, of Albany. Speedy recurrence in the cord and inguinal glands ; 4 operations were performed, 2 by Dr. Coley. Erysipelas toxins were tried for 3 or 4 weeks without effect ; the tumors recurred, and the patient died in Jan. 1898. "Round-celled sarcoma."
108	Wm. B. Coley. Ibid.	27	Family hist. good ; kicked by a horse 2 years before ; a small lump appeared in the testicle, and although it never disappeared, it did not increase in size until 4 mos. ago, when the patient fell through a hayrack again injuring the same testicle ; immediately afterward the old swelling began to increase in size and continued to do so rapidly until Aug. 8, 1898, when it had attain'd the size of a cocoanut ; general health perfect ; a diagnosis of sarcoma was made, and immediate castration advised.	Aug. 8, 1898	Wound healed by primary union. No end-result.

CASE I.—S. M. R., aged forty-two years, dairyman. At the age of eight years had a swelling of the right testicle, the size of a chicken's egg, without apparent cause ; swelling disappeared after a week's treatment, and the patient had no further trouble until November, 1885, when he sustained a severe saddle-bruise of the same testicle, followed by faintness and nausea, but not by any marked inflammatory reaction.

In the early part of December, 1885, the patient noticed a small induration in the injured testicle, about the size of a pea, which gradually enlarged until, when seen by me in June, 1886, it had attained the size of a goose-egg, and was quite painful.

Believing the tumor to be due to chronic inflammation, I advised a suspensory bandage and the application of belladonna and compound iodine ointment to relieve pain and promote absorption.

As the patient lived fifty miles away from my office, I did not see him again until March, 1887, when he reported that the tumor had slightly diminished, but was now again increasing in size. Suspecting for the first time the real nature of the tumor, I urged its removal ; but he declined, until failing health, a poor appetite, backache, and dragging pain in the groin and loin induced him to consent to an operation, which was done March 1, 1888, with the assistance of Dr. H. I. Raymond, U. S. A. The scrotum contained considerable fluid. Cord and vessels were tied *en masse*, high up, with coarse silk ligature, and the testicle removed. There was no evidence of involvement of the spermatic cord. Antiseptic dressings, primary union, except in the lower end of the wound, where the drainage-tube had been left. Ligature came away on the fourteenth day after operation. Wound healed without a local return of the disease, but a few weeks later a secondary retroperitoneal growth appeared, from which he died June 27, 1888.

The tumor was forwarded to the Army Medical Museum, and upon arrival measured 5x3x3 inches. Microscopical examination by Dr. W. M. Gray showed it to be an "alveolar sarcoma." (Specimen A. M. M., No. 9864.)

CASE II.—R. H. M., aged thirty-two years. When nine years old received a contusion of the right testicle, followed by a swelling. After recovery a small, indurated nodule remained. In 1883 this nodule had attained the size of a chicken's egg. While riding a "bucking horse" the tumor became contused. It gradually enlarged, at first slowly, afterward more rapidly, but without much pain. On June 21, 1888, the tumor had attained the size of the head of a new-born child, and was removed by Dr. H. I. Raymond, U. S. A., with my assistance.

Antiseptic precautions, spermatic cord tied, tumor enucleated, catgut suture and ligature applied, thorough drainage. Temperature normal on third day; dressings removed on eighth day; primary union.

Tumor, when fresh, weighed twenty-six ounces. Microscopical examination by Dr. W. M. Gray showed it to be a round-celled alveolar sarcoma. Patient doing well up to date. (Provisional pathological specimen A. M. M. No. 2301.)

CASE III.—W. H. H., aged fifty-one years. No history of malignant disease in family. Hurt his testicle when a child, and again later while riding horseback. No trouble, however, until he hurt it again (probably in 1888), when it became inflamed and painful and confined him to bed. April 7, 1888, Dr. J. Ford Thompson removed it. Patient did well until April 12th, when wound was swollen and painful. Wound was opened and discharged pus, after which it healed.

The tumor was contributed to the Army Medical Museum by Mr. W. F. Works, medical student, and is numbered 2274, prov. path.

In August, 1890, the patient had symptoms of lung trouble, and in January, 1891, had profuse hemorrhage from bowels, severe pain in the right side of liver, slight cough, bloody and frothy sputa and occasionally mixed with fibrinous substance. No large hæmoptysis; was treated by some irregular physician till March 29th, when Dr. D. W. Prentiss saw him for the first time. He was much emaciated, pain in right side of chest, cough, bloody sputa. On auscultation and percussion found left lung normal; right lung solid except two small areas, one near apex, the other at base, anteriorly. Sputa examined by Dr. Theobold Smith; no bacilli. Bedsores beginning to appear on hips and sacrum. Potassium iodide and mercuric chloride for three weeks; subsequent treatment morphine, tonics, and stimulants.

Right side of chest became enlarged and intercostal spaces obliterated. Dr. Thompson aspirated and removed blood and what resembled partly organized fibrin. Dr. T. Smith examined this and reported it "sarcomatous." Patient died August 21, 1891.

Necropsy by Dr. R. T. Edes. Extreme emaciation. Right lung showed nodules of sarcoma and firm blood-clots throughout, except a small patch of normal tissue in upper lobe and a cavity in lower lobe containing about two ounces of pus. Lung firmly adherent almost everywhere. Right fourth to seventh ribs, inclusive, eroded posteriorly by pressure. Left lung normal except upper part of lower lobe, which was solidified and grayish. Heart flabby, normal. Intestines and liver normal. Spleen small, otherwise normal. Right kidney normal, left congested. Lymphatic glands of abdomen not enlarged.

Dr. W. M. Gray, of the Army Medical Museum, examined the testicle and lung and reported both as showing "lymphosarcoma." See also "Sarcoma of the Lung," by Dr. D. W. Prentiss, *Trans. Assoc. Amer. Physicians*, vol. viii. p. 191.

CASE IV.—J. J. M., military convict, Irish, aged twenty-nine years, cachetic; had syphilis about 1882; no secondary or tertiary symptoms except, perhaps, chronic posterior nasal catarrh; left testicle said to be growing larger for a long time. On October 1, 1892, was admitted to Post Hospital, Alcatraz Island, Cal., with subacute orchitis; discharged October 31st. November 25th readmitted; testicle said to be growing rapidly, about four inches long and eight inches round; some pain on pressure, fluctuating spot near apex. Removed three drachms of yellowish fluid by exploring needle and applied strapping. November 30th removed two drachms of sanious-colored fluid and applied cold and strapping. December 7th testicle excised by Dr. Ogden Rafferty, U. S. A.; silk ligature and catgut sutures were used. Eight hours after operation a hemorrhage of two ounces occurred, which ceased spontaneously upon removal of bandages. Drainage-tube removed on the fourth day; three of the lower sutures absorbed. Discharged from hospital and the service December 22d; about one inch of the wound not quite healed. No subsequent history. The testicle weighed five ounces, and upon being cut open, discharged about one ounce of a thin, yellow fluid. In the centre was a hard nodule and a putrid, greenish fluid.

Microscopical examination by Dr. W. M. Gray shows the tumor to be a small round-celled sarcoma." (Specimen A. M. M., No. 2975.)

CASE V.—J. Y., colored, aged twenty-two years. Testicle had been large and hard from boyhood. April 1, 1894, he noticed pain and a lump in right side of abdomen. Admitted to Freedmen's Hospital May 15th. Emaciation became progressive; pain not severe; the tumor showed as a conical eminence on right of middle line; edge of liver recognizable below; an ill-defined tumor in lower left abdominal quadrant. Tumor grew rapidly; no obstruction of bowels. May 29th Dr. Robert Reyburn opened the abdomen, and, finding the growth malignant, closed the wound. Patient died June 2, 1894.

Necropsy. Testicle converted into an oval, sarcomatous tumor 4 x 5 inches in diameter. Nodule in lower lobe of right lung. Heart weighed nine ounces, liver six pounds; contained sarcomatous nodules. Spleen atrophic, 2.25 ounces; right kidney 3.5 ounces, congested. Peritoneum and lumbar glands showed sarcomatous nodules. Specimen No. 10,733. A. M. M., was contributed by Dr. E. F. King, and microscopic examination shows it to be a "round-celled sarcoma."

CASE VI.—A. W., private Eighteenth Ohio Volunteers; had mumps in 1861, at the age of twenty-one; claims that he took cold, which resulted in metastasis of both testicles, especially the right. In February, 1885, he stated to a board of medical examiners that the testicle had been getting hard and large for the last ten years, and that the left testis had diminished in size, and the board declared: "We find the right testis firmly retracted on external abdominal ring the size of a goose-egg; very hard, evidently partially ossified." A previous board, which examined the patient in June, 1883, makes no mention of a tumor, but states, "right testicle has not descended into scrotum, though outside of the external abdominal ring." His family physician states that he found the testicle enlarged in June, 1883, and upon examination in March, 1885, the tumor had enlarged considerably, and was removed in April, 1885. Dr. Gaston treated the man from August 4, 1885, to his death, November 17, 1885, and states that there was an abscess of the spermatic cord on the right side, and on the same side one of the inguinal glands was enlarged to the size of a goose-egg, very hard to the touch and very painful. In October, 1885, the gland softened, and, when lanced, suppurated freely; lower limbs swelled; erysipelas attacked the inflamed gland, scrotum, penis, and inside of thighs, and patient died from septicæmia.

Specimen No. 1891, prov. path., A. M. M., contributed by Dr. John Campbell, medical referee U. S. Pension Office; and Dr. W. M. Gray, on microscopical examination, finds it to be a "large, round-celled alveolar sarcoma."

DETACHMENT OF THE RETINA.

By Matthias Lanckton Foster, M.D.,
ASSISTANT SURGEON, MANHATTAN EYE AND EAR HOSPITAL.

Some apology seems to be fairly due for the infliction of a paper on a subject in regard to which so much has been written and so little progress made in our knowledge, especially when I can advance no claim to new discoveries or to the solution of the vexed questions of its etiology, pathology, and treatment. But when I consider the statistics of Rydel,[1] who found detachment of the retina to be the cause of blindness in 5 per cent. of all cases, I am impressed that the importance of the subject and of the stimulation of research toward the determination of the essential nature of this disease and of therapeutic means whereby we may remove these veils of blindness from the eyes of our patients pleads for frequent reiteration. This is my apology for the presentation of a trite and well-worn subject.

A man, aged fifty-one years, was admitted to Dr. Pomeroy's clinic at the Manhattan Eye and Ear Hospital, August 24, 1896, and placed under my care. The right eye had been injured eleven years before, the lens was cataractous, the iris at the margin of the pupil was firmly attached to the anterior capsule, vision was reduced to perception of light, and the projection was bad. The vision of the left eye had been gradually failing and suddenly became almost abolished. No history of traumatism to this eye was elicited.

When admitted to the hospital, eccentric vision of the left eye was

3/cc, while direct vision was reduced to perception of light. Several points of detachment of the retina could be seen with the ophthalmoscope, the largest one situated above and to the nasal side, three small ones in the temporal portion about the macula, and two medium-sized ones in the lower part of the fundus.

The patient was placed in bed, where he remained with his eyes bandaged for three weeks, during which time he received almost daily large subcutaneous doses of pilocarpine, sufficient to induce a copious diaphoresis. At the expiration of this time the three small detachments in the temporal part of the fundus were found to have disappeared, and the patient had a direct vision of 7/cc. I then cocainized the eye, turned it well down with fixation forceps, and introduced a Graefe knife through the sclera posterior to and to the nasal side of the insertion of the superior rectus, at the point which seemed to me most propitious for the evacuation of the fluid in the large detachment in the upper and nasal part of the fundus. This operation, which is really of respectable antiquity, has been known for nearly fifty years as Sichel's. After the escape of a considerable quantity of serum the eyes were bathed with a saturated solution of boric acid, a dressing of bichloride vaseline and cotton applied with a bandage, the patient replaced in bed, and subcutaneous injections of pilocarpine maintained three days longer. All medication was then discontinued and the patient allowed out of bed. The two detachments in the lower part of the fundus still remained, but further interference was deemed inadvisable, and the patient was discharged, thirty-five days after his entrance into the hospital, with a direct vision of 18/cc, which, two months later, had increased to 20/cc. This vision was maintained for about eighteen months. The vitreous remained cloudy, so that, although no patches of choroiditis were at any time seen in the fundus, it is probable that this disease is or has been present. The refraction of the eye is emmetropic, and vision cannot be improved by either a concave or a convex lens.

I made no additional attempt to evacuate the contents of the two detachments in the lower part of the fundus, because I feared at the time that further interference would prove disastrous to the gain in vision which I had obtained, and afterward I was deterred by the consideration that, whatever may be the true theory of the pathology of this disease, it seems to be certain that the evacuation of the subretinal fluid does not remove the cause, but only an effect, and experience has abundantly demonstrated that a reaccumulation may be expected unless nature has interfered and cured the pathological process of which we know little or nothing; therefore, after a reattachment of the retina had been secured over the portion of the fundus most important for visual purposes, if the reaccumulation of fluid could be confined to the visually less important part of the fundus, the best chance for prolonged benefit would be afforded the patient. The detachments which were left slowly increased in size, while the central vision remained at the maximum point of improvement obtained—two facts which showed that the disease had not been eradicated, and that the maintenance and increase of these detachments did not appear up to a certain point to exert an injurious effect upon the visual power of the reattached retina. Further than this, I incline to attribute to this factor no inconsiderable portion of the prolonged respite from blindness which this patient enjoyed.

THE DIGESTIBILITY OF MOTHERS' MILK IS THE ONLY COMMON-SENSE, SCIENTIFIC STANDARD FOR THE FOOD OF HEALTHY INFANTS.

Mothers' milk has a peculiar characteristic digestibility (not "easy" for the infant) simply suited to its functions.

Properly digestible food is absolutely essential to the natural development of the digestive powers. Digestion develops by normal exercise of the digestive functions and by normal nutrition. Development is not helped by a food "a little difficult" to digest. Indigestible food retards growth, renders, weaning difficult, and makes dyspeptic children.

Milk prepared with Fairchild's **PEPTOGENIC MILK POWDER** by the regular directions, gives the infant stomach just the same work to do as does mothers' milk. The caseine of the milk, under the action of the Peptogenic Powder, has undergone no greater modifications than are necessary to bring it to the soluble condition characteristic of the albuminoids of mothers' milk.

"Peptogenic" milk is not in the least unnaturally easy of digestion; there enters the infant stomach no pepsin, no artificial digestive of any kind—it is just like mothers' milk, the baby has to do the rest.

Send for sample and pamphlet to FAIRCHILD BROS. & OSTER, New York.

MALTINE is a highly concentrated extract of barley, wheat and oats. Barley alone is employed in the manufacture of all other malt extracts, and not one of them is as highly concentrated as MALTINE.

MALT EXTRACTS which are thinner than MALTINE are thinner for the simple reason that they contain more water—are not concentrated as MALTINE is and therefore are less nutritious and more costly.

Maltine

MALTINE is rendered particularly delicious and refreshing if administered with any of the aerated waters, milk, wine or spirits. Thus a pleasing change is afforded to capricious or fastidious invalids.

MALTINE, aside from its great nutritive value, is so rich in Diastase that a dose readily digests all the starchy food, such as bread, potatoes and cake, which the average adult eats at a single meal.

HOME MODIFICATION
OF
FRESH COW'S MILK

Mellin's Food affords the simplest means and gives the best results

"Mellin's Food actually assists to digest milk."—G. W. Wigner, F. I. C., F. R. C., President Soc. of. Pub. Analysts, London, Eng.

MELLIN'S FOOD COMPANY . . . . . . BOSTON MASS.